

# FLIGHT

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

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## Flight.

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## EDITORIAL COMMENT.

### Honours and Promotions for Our Flying Officers.

Having regard to the arduous and risky work they have carried on since the outbreak of war, and the success they have achieved, there will, we imagine, be no one who will do other than offer their sincerest congratulations to the intrepid flying officers in the naval and military air services who are being singled out for distinction. A full record of these honours and promotions is being regularly chronicled in the pages of FLIGHT, but this need not prevent our drawing special attention in this column to the promotion of Sir David Henderson, K.C.B., D.S.O., from Brigadier-General to Major-General. As Chief of the Royal Flying Corps, this officer has done most valuable work, and the higher rank to which he has been raised will undoubtedly be taken as a mark of honour to, and by, the members of the Corps who have so unflinchingly carried out the duties he has entrusted to them. It is also gratifying to find that the French Republic has, through the President, expressed its opinion of the Royal Flying Corps by conferring the Legion of Honour upon representatives of the various squadrons, and including the names of a number of non-commissioned officers and men in the list of those

on whom it has bestowed the greatly-coveted decoration of the "Medaille Militaire."

In dealing with the honours that are being awarded to those service pilots, who, while undertaking dangerous duties, have been fortunate enough to complete them without accident or injury, we are sure that we shall but express the feeling of all, especially those more intimately associated with aviation, when we voice the hope for the speedy recovery of those equally gallant men who have met with mishap in the course of their adventures, and also in offering a tribute to the devotion to duty of those who unfortunately have paid forfeit with their lives in honour and the defence of their country. We also extend an expression of deep sympathy to the parents and relatives who remain to mourn their loss.

There is one pleasing feature in connection with this matter of the work aircraft is doing in connection with the naval and military operations, and that is the gratifying way in which new students of aviation are presenting themselves at the different flying schools throughout the country. As our reports show, a busy state of affairs is prevailing in this direction, and hardly a week passes that the Royal Aero Club does not issue a long list of new recruits to the ranks of aviators who have earned their pilot's certificate, showing that the risks and dangers associated with aviation in actual war time have not acted as a deterrent, but, quite the contrary, as a spur in increasing the number of those anxious to serve their country in this period of national danger by preparing themselves to become efficient units in this all-important branch of our services.

### The Aeroplane Industry. A Busy Time.

Not only are the flying schools busy, but we are not far wrong when we state that never at any period in the history of aviation has there been such an activity prevailing on the constructional side of the aircraft industry as exists at the present time. Not only is work being carried on at high pressure at Government establishments, but all the private works capable of turning out reliable machines are as "busy as bees." A similar remark also applies to those engineering firms who have devoted attention to the production of aero-engines, and who are in a position to deliver motors that will meet Government requirements.

No official information is available as to the wastage that is going on in the matériel of the Royal Naval Air Service or the Royal Flying Corps, but that this is without doubt fairly heavy may be accepted as certain, having

regard to the drastic and unusual conditions under which the operations are being carried on. It therefore follows that a steady output of new machines must be maintained to replace those damaged or destroyed during the war. In this connection it may be mentioned that according to the *Paris Journal*—although we do not quite appreciate how they have been able to secure with any accuracy the information, having regard to the existing "fog of war"—up to the middle of October no less than one hundred aeroplanes belonging to the enemy have been put out of action, to replace which three of the most important German builders are turning out new machines at the rate of fourteen per week.

As in the case of motor transport on the road, the war is undoubtedly teaching many valuable lessons with regard to the different types of seaplanes and land machines, as well as to various details in their construction, that will bear good fruit immediately, and still more so when the great struggle is over. Thus, our French contemporary quoted above also states that aircraft builders in Germany have completely given up constructing monoplanes of the now famous "Taube" pattern, and are building nothing but biplanes to designs based on French models. It is too early yet to go deeply into the question of the effect of the war on aircraft design and construction, but sufficient is already known to indicate that considerable revision work will have to be considered when peace has been restored.

## Naval and Military Aviation in the Far East.

We are glad to be able to put on record the fact that in the joint operations of the Japanese and British navies and military forces in capturing Tsing-tao and thereby driving Germany from the China Seas, the aircraft divisions, both naval and military, of our Ally's forces have done excellent work. No sooner had war been declared on Germany by Japan than a blockade was commenced both by land and sea, a fleet of aeroplanes and seaplanes being transported to the scene of operations on the coast of China, a number of adjacent small islands being also occupied to serve as a base for the naval section.

True to their national characteristics, the Japanese were not far behind European countries in their realisation of the very important part aviation would play in future wars, and a large number of young Japanese



## AIRCRAFT WORK AT THE FRONT.

THERE was the following reference to aircraft in the account from an "Eyewitness" present with the British General Headquarters, dated November 1st, and issued by the Press Bureau on the 7th inst. :—

"The results of the inundation to the north of Dixmude have been observed by our aviators, who have seen numbers of the enemy collected in groups on the dykes which intersect the flooded area, where, according to report, some of the German heavy artillery is bogged. Our airmen have also been able to harass advancing hostile columns by bomb-dropping and machine gun fire. The tactical transfer of troops behind the German front line is now carried out to a great extent by motor omnibuses, of which long strings are visible from above."

## The Roll of Honour.

In the list of casualties in the Expeditionary Force reported from General Headquarters under date Nov. 1, was the following :—

### Officer Wounded.

Higgins, Major J. F., D.S.O., Royal Flying Corps.

officers were promptly despatched to the Old and New Worlds to go through a flying course, with a view, not only of acting as pilots themselves, but also of becoming tutors to other prospective aviators in their own country. How well they have succeeded we are able to glean from some private information and the work of correspondents that has reached us this week from Yokohama, which shows that since the attack on Tsing-tao was commenced towards the end of August last hardly a day has passed without flights being made over the forts of the enemy either by Japanese naval or military pilots. Among those who have thus distinguished themselves are Lieut.-Commander Kanedo, Lieuts. Wada and Yameda, Lieut.-Engineer Hanajima, and Sub-Lieuts. Fujise, Takebe and Itakura.

Although Tsing-tao was a fairly strong place, the defence, having regard to the fact that there was no possibility of relief for the Germans occupying it, was hopeless from the first. It was, however, expected to hold out for at least six months, whereas actually, only practically as many weeks elapsed ere the flag of surrender was run up. Although the effective combination of the land and sea forces has doubtless had much to do with the rapid success that has attended the efforts of the attackers, the Japanese press would appear to agree that the honour of the operations very largely lies with the aeroplanes and seaplanes and their gallant pilots. Their work in reconnoitring the enemy's position has been of the greatest value. On the other hand, judging from the information we have received, the bomb-dropping, while effective in many cases, has not been so generally successful as the reconnoitring work.

Needless to say, the experiences of the pilots have not only been thrilling but extremely instructive. For example, as a result of the many flights that have been made, it would appear that the aviator, even when the bullets are flying all around him, has an excellent chance of escaping. The official reports showing that while numerous shots have passed through aeroplane wings, the engines and the pilots have not been such easy targets. Indeed, it is stated that not one of the Japanese flying officers has been brought down by the enemy's guns, notwithstanding the numerous flights that have been made over the forts, a state of affairs on which our flying *confrères* in the Far East are to be heartily congratulated.



## FRENCH HONOURS FOR THE R.F.C.

AN Army Order issued on Saturday states that the President of the French Republic had bestowed the French Military Medal for Conspicuous Service in the Field, equivalent to the British Medal for Distinguished Conduct, on the undermentioned warrant officers, non-commissioned officers, and mechanics of the Royal Flying Corps (Military Wing), with the approval of His Majesty the King, in recognition of their gallantry during the operations between August 21st and 30th :—

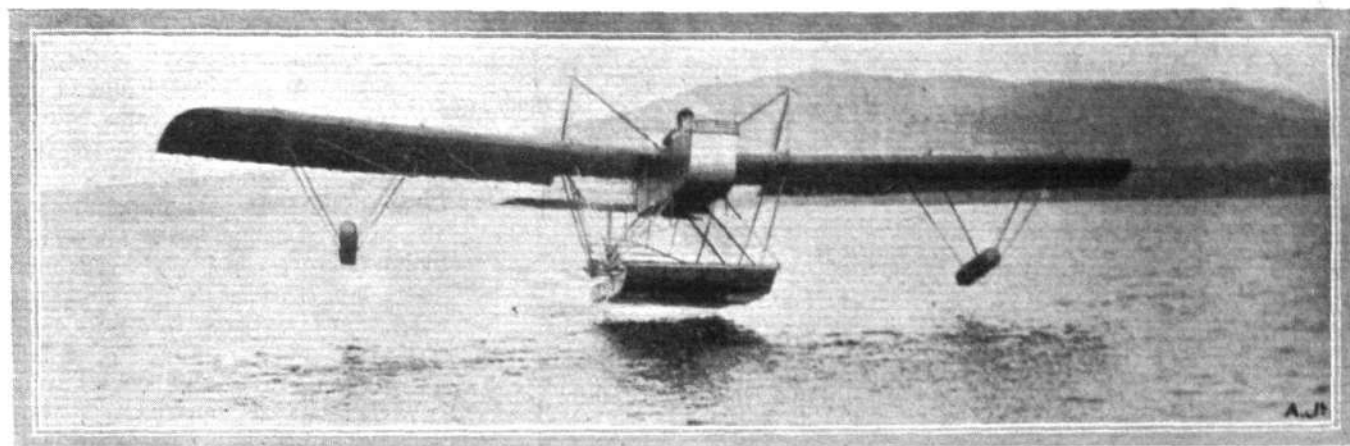
Sergeant-Major T. Bullen.  
Corporal C. R. S. Evans.  
1st Class Air-Mechanic H. J. Gardner.  
Corporal T. L. Gliddon.  
1st Class Air-Mechanic H. Jameson.  
Corporal S. Jenkins.  
1st Class Air-Mechanic D. McIntyre.  
Sergeant-Major A. H. Measures.  
1st Class Air-Mechanic W. P. Parker.  
Corporal F. W. Powell.  
1st Class Air-Mechanic A. H. Reffell.  
Sergeant E. J. Street.  
Sergeant E. L. Taylor.  
Sergeant-Major F. H. Unwin.

# WATERPLANE FLYING AT WINDERMERE.

ALTHOUGH comparatively little has been heard with regard to the activities of the school and works of the Lakes Flying Co., on Lake Windermere, a good deal of constructional and school work has been done, resulting in

design has been evolved and given excellent results, which does its designer, Mr. Gnospelius, as well as its constructors, the Lakes Flying Co., credit.

Arrangements have now been considered for the

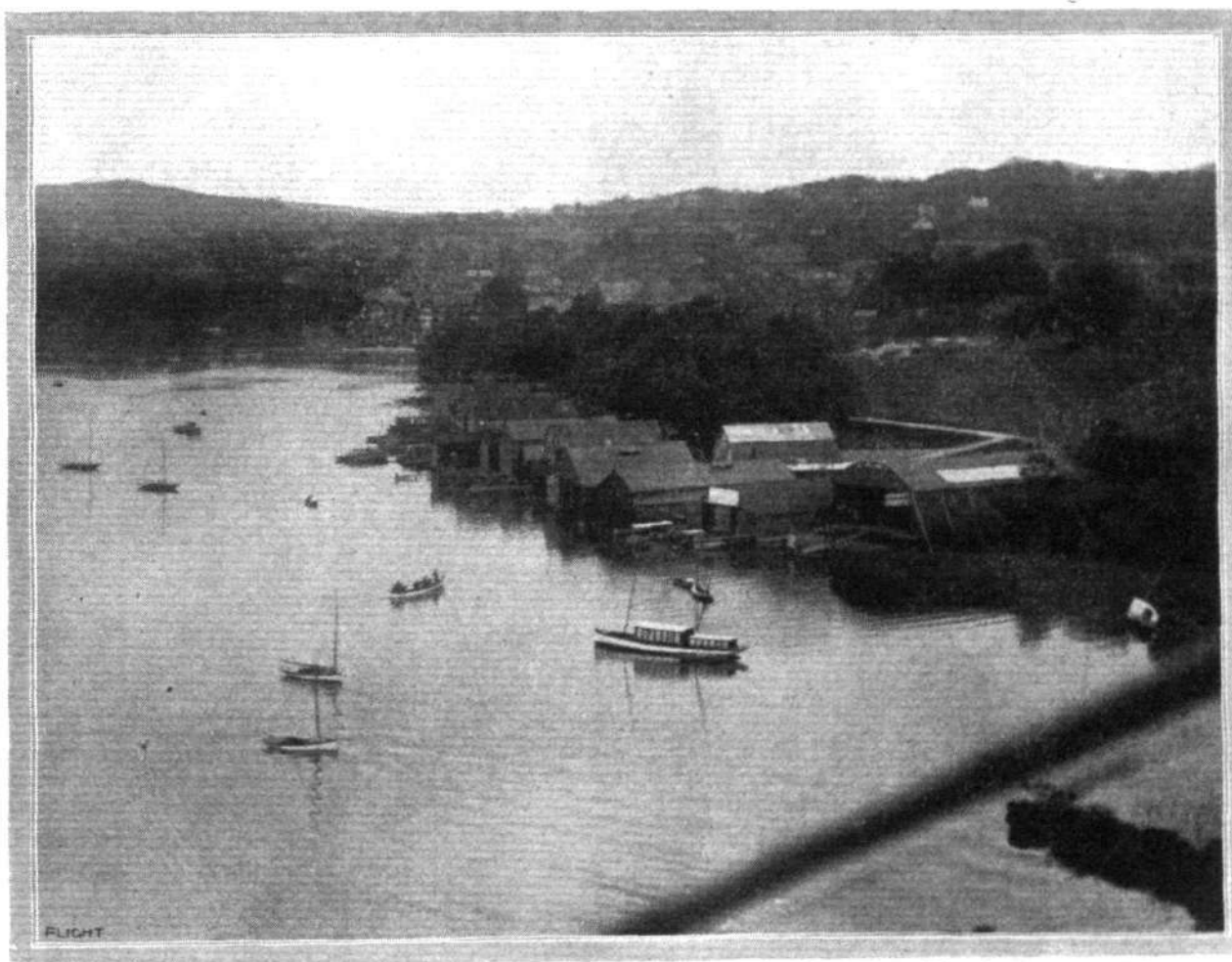


Mr. W. Rowland Ding on the monoplane just off the surface of Lake Windermere.

*Photo. by Herbert and Son, Bowness.*

the production of several school machines and a number of pilots, some of whom have turned out really fine flyers. Under the management and direction of Mr. E. W. Wakefield, who has up to quite recently been the director and owner of the Lakes Flying Co., a machine of original

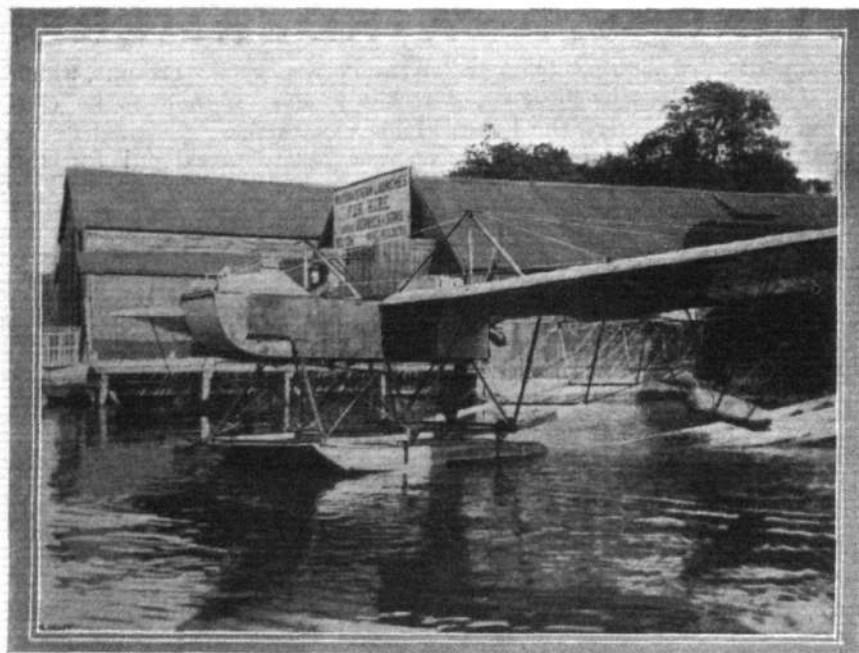
Northern Aircraft Company, Ltd., whose director and manager, Mr. W. Rowland Ding, is well known as a particularly successful pilot of the Handley Page biplane, to take over the whole business of the Lakes Flying Co., including the hangars, machines, plant, &c., and it is



View of Bowness and part of Lake Windermere, showing the Lakes Flying Co.'s hangar in flight.

*Photo. by Herbert and Son, Bowness.*





*Photo. by Herbert and Son, Bowness.*

The hydro-monoplane designed by Mr. Gnospelius and built by the Lakes Flying Co., which has now been acquired by the Northern Aircraft Co. Mr. W. Rowland Ding is in the pilot's seat ready for a flight.

intended to start immediately with the school and works. The present equipment of the school comprises three machines, including the new monoplane referred to above,

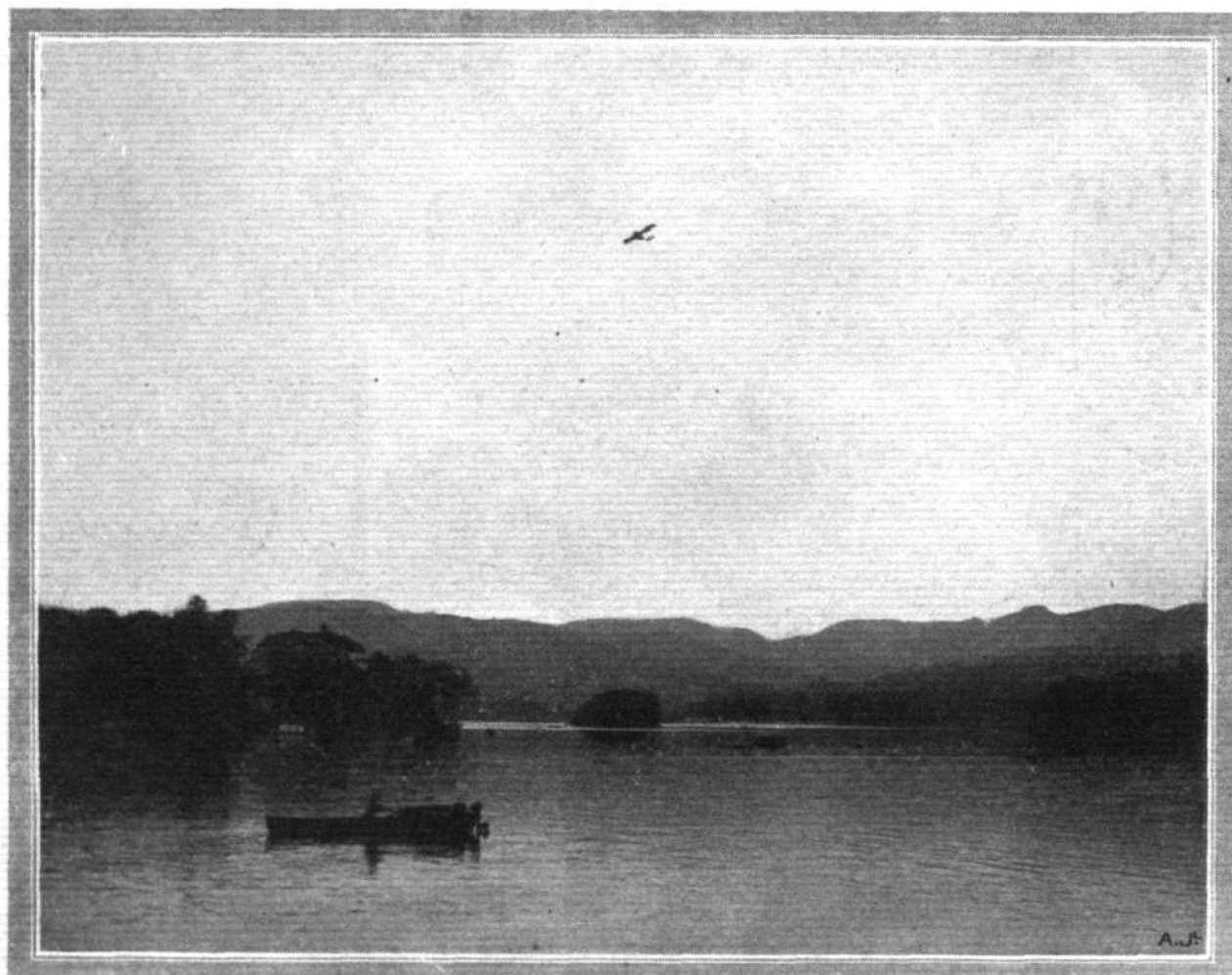
whilst the construction of new machines will be commenced at once. As Mr. W. Rowland Ding, in addition to being an experienced pilot, is also a capable designer, the appearance of the new machines will be awaited with interest.

It seems likely that the new school will quickly become popular, for Lake Windermere is in a very attractive flying venue, owing to its elongated shape, a "straight" of eight miles in length and an average width of about three-quarters of a mile, increasing in places to slightly over a mile.

As most of the tuition work will take place over the lake, the danger of serious accident should be remote, especially as a motor boat of 12 h.p. is always in attendance upon the waterplanes. Apart from the waterplanes it is intended to build several land-going machines, so that pupils will have an opportunity of making themselves acquainted with the handling of both types. Attached to the school is also a very fine hydroplane, fitted with a 50 h.p. water-cooled Clerget engine. This boat has a speed of about 50 m.p.h., and will carry four passengers. It will be at the disposal of the pupils, and should

form one more attraction to the, in this respect, already well-provided school.

Mr. Ding's own description of his first experience with



*A.J.*

*Photo. by Herbert and Son, Bowness.*

Mr. Rowland Ding well up over Lake Windermere on the waterplane.

the water monoplane, of which we hope to be able to give full details later, forms very interesting reading, and, incidentally shows how easily a capable pilot, who has had no previous experience with waterplanes, can master the handling of this type of aircraft. Mr. Ding puts his initial efforts on the Lakes machine as follows:—

"On arriving at Windermere I found that there were three machines: 1. The 'Water-Hen,' the Farman-type biplane with front elevator, built by the Lakes Flying Co., of which a description, with scale drawings, appeared in *FLIGHT* some time ago. 2. A 50 h.p. Gnome-Avro biplane. 3. A very interesting 80 h.p. 'pusher' monoplane, designed by Mr. Gnospelius and built by the Lakes Flying Co., this machine being not quite finished.

"I decided at once that the third machine was the one which would probably put up the best performances, and I therefore packed the others in different hangars out of the way and set to to finish it off. As soon as finished I had this machine placed on its bogey and run down into the lake, and after a short preliminary run of the engine, which behaved splendidly, I set off on my first waterplane trip.

"I may say that I have never seen a waterplane in the air, and only know what it looks like from photographs. It was with some fear and trepidation that I opened the engine out and waited to see what would happen. One or two seconds after I started I found that I had not the throttle adjusted quite right, and therefore began to adjust it in order to get more speed out of the engine. So busy was I doing this that I did not notice that I had left the water and got some 20 feet into the air, and when I found what had happened I felt very relieved indeed, as I had been told that about the first thing I would do would be to get the front of the float under the water and turn a somersault!

"The machine felt so nice in the air that I took it straight up to about 600 or 700 ft., and managed to do quite small circuits. I found out, however, that the side areas were all wrong, and the machine had a great tendency to spin, this being probably due to the fact that it has a very large square-sided body, protruding out in front of the machine à la Henri Farman, with not much fixed tail area at the back to counteract it. After the

first flight I therefore had a large fin made and fitted to the rear of the machine, and, on trying it again, I found that this was a wonderful improvement, as the machine now seems as nice to handle in the air, although somewhat slow, as any I have tried, and there is no tendency to spin at all. The third flight I made with a passenger of about 12½ stone, and this flight was quite successful. The machine lifts a passenger quite well, and will do as small circuits as any machine I have seen.

"I find landing on the water quite as easy as landing on *terra firma*, except perhaps when the Lake is so smooth

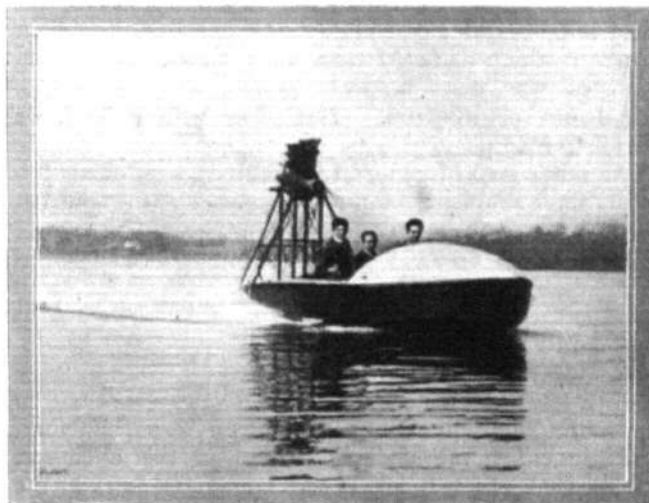


Photo. by Herbert and Son, Boconess.

The Lakes Flying Co.'s air-propelled hydroplane at full speed.

that it looks like glass, but one soon gets used to this too.

"I am sending you several photographs of this new machine, which deserves to be noticed, as it is of a type which is distinctly original, and which, if it was a little faster (its present speed being about 55 m.p.h.), would be as good a flying machine as any in the country, especially considering that at present it has on it a somewhat heavy and old 'single' float which was not designed for it."

## THE BRITISH AIR SERVICES.

### Royal Naval Air Service.

The following was announced by the Admiralty on the 7th inst.: Capt. Edward H. Ward, R.M.A., to the "President," additional, for duty in Air Department, temporary. To date November 4th.

The following were announced by the Admiralty on the 9th inst.:— Probationary Flight Sub-Lieuts. H. Rosher and E. G. Riggall have been confirmed in the rank of Flight Sub-Lieutenant, with seniority of August 18th, and appointed to the "Pembroke III," for duty with R.N. Air Service, November 7th.

The following was announced by the Admiralty on the 10th inst.: Squadron Commander P. A. Shepherd to the "Pembroke III," for duty with R.N. Air Service. November 1st.

The following were announced by the Admiralty on the 11th inst.:—

Acting-Capt. William L. Elder to "President," additional, for duty as Inspecting Captain of Aircraft Building. November 10th.

James C. P. Wood has been entered as Probationary Flight Sub-Lieutenant, and appointed to the "Pembroke III," for Hendon Air Station. November 10th.

J. Cunningham Mitchell entered as temporary Warrant Telegraphist, and appointed to the "Pembroke," additional, for Farnborough Naval Air Station. November 10th.

Lieut. A. P. Mackilligin, R.N.V.R., to "Actæon," additional, for (G.) duties with Aircraft. November 10th.

### Royal Flying Corps (Military Wing).

The following appeared in the supplement to the *London Gazette* issued on the 5th inst.:—

Sec. Lieut. (on probation) Denys Corbett-Wilson is confirmed in his rank.

The following appeared in the *London Gazette* of the 6th inst.:— Capt. H. Wyllie, 9th (Cyclist) Battalion the Hampshire Regt., to be a Flying Officer. Dated October 26th, 1914.

*Special Reserve of Officers. Supplementary to Regular Corps.*— Sec. Lieut. (on probation) Archibald B. Ford is confirmed in his rank.

The Hon. Arnold J. W. Keppel to be temporary Second Lieutenant. October 29th, 1914.

The following appeared in a supplement to the *London Gazette* issued on the 9th inst.:—

The undermentioned Lieutenants, Special Reserve, to be Flying Officers. Dated June 30th, 1914: Arthur L. Russell, Arthur A. B. Thomson, and Louis A. Strange.

The undermentioned to be Flying Officers: Alastair St. J. M. Warrand, the Black Watch (Royal Highlanders), and to be seconded. Dated October 21st, 1914. Dated October 30th, 1914: Captain J. H. A. Landon, 4th Battalion Essex Regiment.

*Supplementary to Regular Corps.*—Alexander Burnell Rendall, from Inns of Court Officers Training Corps, to be Second Lieutenant (on probation). Dated November 10th, 1914.

The following appeared in a supplement to the *London Gazette* issued on the 11th inst.:—

Capt. J. G. Weir, 3rd Highland (Heavy) Brigade, R.F.A., Territorial Force, to be a Flying Officer. October 28th, 1914.



## THE LATE MR. E. T. BUSK.

By the lamentable and tragic death of Mr. E. T. Busk, on November 5th last, not only aviation, but the nation itself has sustained a loss which it is difficult to over-estimate, as he represented a type of worker that is all too rare, the practical scientific man. He was no mere theorist, for the results of his researches in the realms of practical science, notably in regard to the stability of aeroplanes, have achieved world-wide renown; and his decease is deeply deplored by his large circle of friends at Farnborough and elsewhere, as much because of his cheery and charming personality, as because of the gallant manner in which he faced every kind of risk in the verification of the mathematical theories he had himself worked out or inspired. His place will, indeed, be difficult to fill.

Like other men of genius, his methods were characterised by their simplicity, and notwithstanding the speed at which he worked, any conclusions at which he arrived could be relied upon as being scientifically sound and exact. His youth, for he was only 28 years of age, is an added cause for regretting the termination of a career so brilliantly commenced.

Mr. Busk's scientific attainments and versatility were shown by the variety of matters which were entrusted to him by the Superintendent of the Royal Aircraft Factory. These included the general control of the chemical, metallurgical, and physical research and test work at the Factory. In addition, he was a highly skilled pilot, although he had not taken his certificate, since he had no intention of applying his abilities in this direction to other than purely scientific work; and the unqualified success which attended his efforts was undoubtedly due, in no small measure, to the fact that he was able to test his theories in person.

For the following particulars of Mr. Busk's career we are indebted to one who knew him intimately.



The late Mr. E. T. Busk.

Mr. Edward Teshmaker Busk was born on March 8th, 1886, and was educated at Harrow and Cambridge. A Scholar of King's College, Cambridge, he secured 1st class Honours in the Mechanical Sciences Tripos in 1907, and won the John Wimbourne Prize, &c. He early distinguished himself as an engineer during the years he was employed at Messrs. Hall and Co.'s works at Dartford.

On June 10th, 1912, he joined the staff of the Royal Aircraft Factory as Assistant Engineer in charge of Physical Experimental work, where he devoted much of his time to the mathematics and dynamics of stable flight on the full size, as distinct from the model, aeroplane. He introduced many valuable improvements, of which it is not permissible to give particulars at the present juncture, his work not being confined solely to the solution of aeroplane stability, but covering a wide and varied range. His valuable researches into the nature and causes of wind gusts and his work in connection with the offensive and defensive uses of aircraft in warfare may, however, be specially mentioned. He also guided his branch in the production of aeroplane instruments, some of which were exhibited at the Royal Society in May and June, 1913, by permission of the Superintendent, Royal Aircraft Factory.

By the autumn of 1913, his researches into the stability of aeroplanes had advanced so far that complete stability, without material loss of efficiency, could be obtained for any aeroplane designed in accordance with his results. In November, 1913, he was able to make flights of several hours' duration, in winds up to 38 miles per hour, without at any time using any balancing, controlling or steering mechanism whatever, save for alighting purposes. He took Colonel Seely on such an uncontrolled flight, and later on made demonstration flights before Their Majesties the King and Queen. The matter was introduced in practical form to the Royal Flying Corps by his taking the Commanding Officer, Colonel Sykes, as passenger, from the Royal Aircraft Factory, Farnborough, to Salisbury Plain and back; and both passenger and flyer, being freed from the use of controls, wrote notes and observations continuously throughout the journey. This trial was repeated by Colonel W. S. Brancker, the present Director of Military Aeronautics, as pilot, as well as by many other officers; and he was flying his own stable aeroplane at the time of its destruction by fire in the air at Aldershot, at a height of some 800 feet.

So far as it has been possible to reconstruct the accident, the fire is ascribed to the ignition of some petrol vapour; but the exact cause, whether due to back firing, or to a spark from the ignition mechanism or wiring, cannot well be traced, owing to the complete destruction of the machine.

Mr. Busk was a member of the Aeronautical Society of Great Britain (it is characteristic of the man that, despite his proved ability and knowledge of aeronautics, he had not attained the rank of Associate Fellow of the Society), an Associate Member of the Institution of Mechanical Engineers and held His Majesty's commission as 2nd lieutenant in the London Electrical Engineers (Territorial Force). His funeral took place with military honours on Monday last at Aldershot, amongst those present being Lieut.-General A. Hamilton Gordon and representatives from the Royal Aircraft Factory, the Royal Flying Corps and the Aeronautical Society.

# The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

## Aviators' Certificates.

THE following Aviators' Certificates have been granted :—

- 955 Flight Sub-Lieut. Allan Knighton Robertson, R.N.A.S. (Short Biplane, Royal Naval Flying School, Eastchurch). Nov. 5th, 1914.
- 956 Flight Lieut. John William Kidston Allsop, R.N.A.S. (Short Biplane, Royal Naval Flying School, Eastchurch). Nov. 5th, 1914.
- 957 Lionel Franklin Beynon (Wright Biplane, Beatty School, Hendon). Nov. 5th, 1914.
- 958 William Harry Ellison, R.N. (Bristol Biplane, Royal Naval Air Station, Hendon). Nov. 6th, 1914.
- 959 Flight Sub-Lieut. Aylmer Fitzwarine Bettington, R.N.A.S.

(Maurice Farman Biplane, Central Flying School, Upavon). Nov. 6th, 1914.

960 Julian Pauncefote Inglefield (Maurice Farman Biplane, Military School, Brooklands). Nov. 7th, 1914.

## New Members.

Members are reminded that according to the Rules, the Annual Subscription of any New Member they may propose, who is elected between November 1st and December 31st of this year, will cover the period up to December 31st, 1915.

## Royal Aero Club Burgee.

Burgees, embodying the design recently approved by His Majesty the King, namely the Royal Crown with the Caduceus, can now be obtained by Members from the Royal Aero Club, price 6s. each.

166, Piccadilly, W. B. STEVENSON, Assistant Secretary.

## FROM THE BRITISH FLYING GROUNDS.

### Brighton-Shoreham Aerodrome.

**Pashley Bros. and Hale School.**—Up with instructor last week, J. Sibley and J. Morrison. Circuits and eights, T. Cole, J. Woodhouse, Menelas Babiottis, C. Winchester. Instructors for week, C. and E. Pashley. Machines in use, Pashley and H. Farman biplanes.

### London Aerodrome, Collindale Avenue, Hendon.

**Grahame-White School.**—Tuesday, last week, Probationary Flight Sub-Lieuts. Barnes, Bray, Price, Watson and Young straights with Instructors Manton Shepherd, Winter and Russell. Probationary Flight Sub-Lieuts. Wakeley and Livock passenger flights and rolling with instructors. Mr. Stalker solo straights. Messrs. Carabajal and Easter solo circuits, eights, &c.

Thursday, Probationary Flight Sub-Lieuts. Bray, Cooper, Groves, Hodsoll and Mr. Greenwood straights with Instructors Russell, Winter and Shepherd. Probationary Flight Sub-Lieuts. Driscoll and Ffield rolling with instructors.

Friday, Probationary Flight Sub-Lieuts. Barnes, Bray, Cooper, Driscoll, Ffield, Hodsoll, Livock, Price, Wakeley, Watson and Young, straights with Instructors Manton, Russell, Winter and Shepherd. Probationary Flight Sub-Lieut. Groves solo straights. Messrs. Carabajal and Easter solo circuits, &c. Probationary Flight Sub-Lieut. Ffield solo circuits.

**Beatty School.**—Pupils being instructed last week on dual-controlled machines. Instructors, Mr. Geo. W. Beatty and Roche-Kelly. Pupils receiving instruction during the week being, Messrs. Virgilio, Gardner, Parker, Whitehead, Beynon, Moore, Newberry, Anstey Chave, Donald and Wainwright. Mr. Beynon flew for his certificate on Thursday, and took same in very fine style, it being an excellent performance throughout.

**British Caudron School.**—Monday, last week, too windy. Tuesday, morning windy and wet. Evening, school out at 4.30 p.m. Sub-Lieut. Bird rolling and straights. Mr. Gunner rolling. Wednesday and Thursday windy. Friday morning misty. School at 9 a.m. Mr. Ivermee successfully passed for tests A and B of *brevet*. Messrs. Barfield, Burke, Stevens and Williams rolling. Sub-Lieuts. Bird and Tench rolling. Evening, Messrs. Barfield and Stevens straights. Sub-Lieuts. Bird and Tench straights.

Saturday, morning, Messrs. Stevens and Barfield doing straights and half circuits. Mr. Williams and Sub-Lieut. Bird rolling and straights.

**Hall School.**—Monday and Tuesday, last week, gale and rain. J. L. Hall quarter of an hour Tuesday on *brevet* tractor 2H. Wednesday, gale and rain again, and Thursday new 45 Anzani tractor in commission.

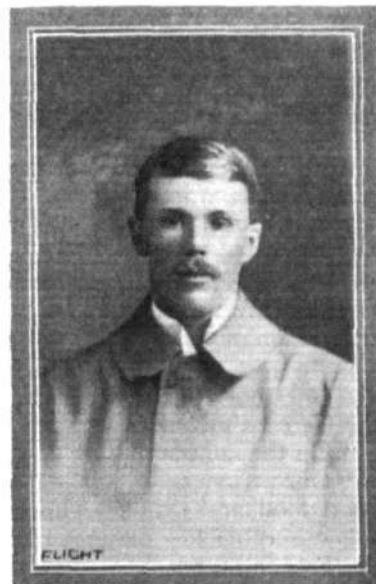
Friday, in morning, J. L. Hall instructing, Archie Davy twelve straights. T. G. Christie 25 mins. at 1,500 ft. doing heavily banked turns and practising long *vol planés*. Later, J. L. Hall out testing tractor biplanes Nos. 2H and 3H. In evening, J. Rose practising figure and *vol planés* from 1,500 ft.

Saturday, J. L. Hall out in morning testing air for 30 mins. On finding air conditions good, J. Rose went for his Royal Aero Club certificate, which he took in most excellent style, taking his height at 1,550 ft. and landing after long *vol plané*. Archie Davy four straights and one straight flight, landing with unpremeditated atterissage and breaking some struts. Later, R. Pinniger four good straights. Dr. Christie

27 mins. at 2,000 ft. on tractor biplane 3H, also T. W. Abbott 12 mins. at 600 ft. on same machine.

Sunday, J. L. Hall half hour at 2,500 ft. Dr. Christie 15 mins. on additional practice machine. Later, Jack Alcock (the well-known pilot) took out the 45 h.p. tractor for a short flight, and expressed himself very pleased with the flying of the little machine.

**London and Provincial Aviation Co.**—During past two weeks the instructors were Warren and Smiles. Messrs. Moore, Abel and Derwin have done good rolling, especially last week on Friday and Saturday. All pupils making good progress; new school 'bus ready for tests this week.



Mr. Rupert Forbes-Bentley, who has recently obtained his certificate at the Beatty Flying School, Hendon.



## EDDIES.

IT has been quite a common practice of German aviators to throw from their machines, when flying over French or Belgian territory, communications intended to intimidate the inhabitants, although such bill-sticking methods have not had any serious effect. It appears that aviators attached to the Allied armies are now retaliating, not, be it said, by endeavouring to frighten the Germans with threats or deliberate falsehoods, but by the much simpler and, let us hope, more effective expedient of telling them the truth. Capitaine-Aviateur Oswald Watt, Escadrille Blériot 30, sends us a sample of the notices distributed by our aviators, a fac-simile of which we reproduce.

### An die deutschen Soldaten ! Es ist nicht wahr

dass wir, Franzosen, die deutschen Gefangenen erschossen oder mishandeln.

#### IM GEGENTEIL,

unsere Kriegsgefangenen werden gut behandelt. und bekommen gut zu essen und zu trinken

Diejenigen von euch, die dieses erbarmlichen Lebens überdrüssig sind, können sich ohne Angst den französischen Vorposten unbewaffnet melden.

Sie werden dort gut empfangen werden.

#### Nach dem Krieg, darf jeder wieder nach Hause

In his letter bearing the Aisne postmark November 3rd, Captain Watt says :—

"We are throwing these notices over the German lines—started to-day."

For the benefit of those readers who may not be over-familiar with the German language the following is a free translation of this suggestive handbill :—

"To the German soldiers !

"It is not true that we, the French, shoot or ill-treat the German prisoners.

"On the contrary,

"Our prisoners of war are well treated and are given good food and drink. Those of you who are tired of this miserable life may report, unarmed, without fear, to the French outposts.

"You will be well received there.

"After the war, all of you will be allowed to return to your homes."

x x x

In addition to the other machines already in use, or building, at the Hall school at Hendon, this stable has received a very valuable increase in the 45 h.p. Caudron biplane formerly owned by Mr. Prosser, who, I regret to say, has given up his school work and is, I understand, going out to Australia with the intention of starting exhibition flights. To the Hall school, however, the acquisition of this machine is hailed with delight by the numerous pupils, one of whom speedily "made good" on it by securing his ticket in excellent style on Saturday last.

x x x

At the L. and P. school at Hendon, another biplane is nearing completion, in fact, by the time these lines appear

it will probably have flown and proved as efficient as the first machine, which it resembles in every way. In spite of the short time it has taken to build this new school 'bus, it is as well made and finished as the first effort, and as there is no lack of spare parts in the "factory," there need be no fear of delay when the inevitable crumpling up comes off.

x x x

Some idea of the activity of the British Emaillite Co., Ltd., may be formed from the further photograph which we are able to give this week, which shows the fifth consignment of the necessary ingredients brought over specially by one of the firm's representatives from the Emaillite head-quarters in Paris. That it has not always been arm-chair work to get the materials transported from Paris to London may be realised when it is pointed out that the third visit was made to Paris at the time when the German forces were at their nearest point to the French capital. Taube monoplanes were dropping bombs at various places, and some fell uncomfortably close to the Emaillite works at the moment when one batch of material was leaving for London. Notwithstanding these little side issues, the goods were delivered two days later at the Shepherd's Bush works.

x x x

In a post-card, dated October 31st, and post marked Gare de Soissons, Aisne, our old friend, Louis Noel, tells us that all is still well with his escadrille. Capt. Watt, he says, had a narrow escape, a piece of a bursting shell piercing his left wing, but fortunately he managed to land safely. Continuing, Noel says, "Since I sent you the last card we have advanced about 18 miles." This means, I take it, that the base from which Noel's escadrille operates has advanced the distance mentioned, and we all join in the hope expressed by Noel that they may soon go forward again.

x x x

I am sorry to hear that that old Hendon favourite Frank Goodden has had a rather bad smash at Farnborough. He was testing a new machine, it appears, when the mishap occurred, but although he was severely injured he is, I understand, out of danger, and is expected to be in flying trim again before very long. All will join in wishing him a speedy recovery.



ANOTHER SIGN OF THE TIMES.—A load of Emaillite materials just arrived from Paris being unloaded at the London works of the British Emaillite Co., Ltd.



The new Grahame-White "pusher" biplane to which reference was made in "Eddies" last week, put up several very fine flights at Hendon on Saturday last. With Flight-Commander C. Grahame-White at the helm, and Mr. Manton in the passenger's seat, she made several circuits of the aerodrome, climbing at a good rate, and doing some steeply-banked turns with all the grace one is accustomed to admire when "G.-W." is in control. Later, Mr. Manton took up two passengers in the same machine, and made a prolonged flight over the outskirts of the aerodrome, the additional weight of the extra passenger not appearing to affect the lifting power to any appreciable extent. Three up with an engine of 60 h.p. only is not bad!

x x x

Besides this new machine, two more school biplanes of the front elevator type are nearing completion. They will be fitted with 50 h.p. Gnome engines, and give the impression of being immensely strong. The workmanship and finish are such as no firm need feel ashamed of in a "show" machine; and, in fact, they give the impression that they are too well finished for school work, remembering that it may be the fate of such a machine to be "piled up" on one of its first flights. They cannot, however, but give the pupil every confi-

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### THE RECENT FATALITIES.

#### The Upavon Fatality.

AN inquest was held on Thursday of last week in connection with the fatal accident to Sub-Lieut. P. B. Murray which was briefly recorded in our last issue. The officer had been at the Central Flying School since September, having previously obtained his pilot's certificate on a hydro-biplane at the Lakes Flying School, Windermere, and he was regarded as more than usually competent, having regard to his short experience.

The evidence showed that when he started his flight the weather was clear but subsequently a thick fog arose. A shepherd on Challton Down saw the deceased pass through the fog overhead and shortly afterward heard a crash. Some time was spent in locating the wreck owing to the mist, and then it was found that the machine had its nose buried in the ground, while the pilot was dead, still strapped in his seat. It was estimated that the machine struck the ground at a speed of about one hundred miles an hour.

Death was due to dislocation of the neck, and the jury returned a verdict to the effect that the airman was killed owing to his machine accidentally striking the ground.

#### The Fatal Accident to Mr. Busk.

AN inquest was held at Aldershot on Saturday to inquire into the accident which caused the death of Mr. E. T. Busk, of the Royal Aircraft Factory.

According to one witness, the deceased was flying at a height of about 1,000 ft. when a small light appeared in the front of the machine, developing into a fierce flame. After gliding for a little way the machine fell to the ground.

Mr. Heckstall Smith, assistant superintendent at the Aircraft Factory, said the accident was due probably to the engine backfiring. The engine had been adopted as the standard factory type, after many months' exhaustive experiment.

A verdict of "Accidental Death" was returned, the jury expressing the opinion that the death of Mr. Busk was a loss to the country.

dence in the strength of his mount; and, after all, good finish is always on the right side.

x x x

Resting with a number of other biplanes in the new huge G.-W. shed is the tractor biplane built for the "Circuit of Britain." This machine will now be fitted with a land chassis and used as a land-going machine. Judging from her performance as a seaplane previous to her smash, this little biplane should develop a very good turn of speed when the extra head resistance of the floats is removed, and her appearance in the air at Hendon is looked forward to with interest. It would not be surprising if she developed a speed of over 90 m.p.h.

x x x

Several of the pupils at Hendon took advantage of the calm weather last Saturday, and apart from school practice one or two were "ticketing" in great style, doing well banked figures of eight and neatly judged landings. If the two pupils whom I saw going for their *brevets* are fair representatives of the pilots being turned out at the various schools at Hendon—and there is no reason to suppose that they are not—we should soon have enough capable aviators to manipulate the new machines that are rapidly materialising from the various British works at such a highly satisfactory rate.

"ÆOLUS."

⊗ ⊗

A portrait of Mr. Busk and reference to his career will be found on page 1114.

#### The Seaplane Fatality.

AN inquest was held at Netley on Monday in connection with the death of Reginald Jordan Alston, a designer of the Sopwith Aviation Co., Ltd., who was drowned in the seaplane accident last week.

Mr. Victor Mahl, the pilot, said that while making a trial flight at a speed of 100 m.p.h. the machine suddenly dived at an angle of 45 degrees into the water.

A verdict of "Accident Death" was returned.

#### Double Fatality in France.

IT was officially announced in Paris on the 5th inst. that Capts. Remy and Faure had been killed in an aeroplane accident at Issy les-Moulineaux. No details were given as to the cause of the accident, but it appears that the machine fell on to the roof of a house and both officers sustained injuries which proved fatal.

#### Double Fatality at Johannisthal.

NEWS was received in Amsterdam last week that two German naval aviators had fallen while practising at Johannisthal, and sustained injuries to which they succumbed shortly afterwards.

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#### Missing Naval Airmen.

ANNOUNCEMENT was made by the Admiralty on Tuesday last as follows:—

"Flight Lieut. Charles Francis Beevor, R.N., with Sub-Lieut. the Earl of Annesley, R.N.V.R., as a passenger, left Eastchurch to fly abroad at a quarter past three o'clock on Thursday last. The machine never reached her destination. Careful search has been made with aeroplane, seaplane, and patrol ships, but no tidings of the missing airmen have yet been received.

"Lieut. Beevor was a skilful and daring pilot, who had been much employed in this war in dangerous enterprises, and who had also seen severe service in the Balkan War. His loss—if it so proves—with that of Lord Annesley will be keenly felt by the officers and men of the Naval Wing."

## AEROPLANE WORK AT TSING-TAO.

THE brief references made from time to time with regard to the use of aeroplanes in connection with the operations round Tsing-tao, came as a surprise to some people who had not realised the extent to which our Eastern Allies had adopted the newest arm of modern warfare. Some idea of the important work done by the Japanese pilots can however be gleaned from the following extracts from the *Japan Weekly Mail* of October 21st, 1914:—

Two Army aeroplanes, on September 25th, reconnoitred over the district along the highland on the left bank of the Litsun River. They received more than 50 shots from the enemy on the right bank of the Haido River but suffered no damage.

Early in the morning of September 26th, one aeroplane scouted over the left bank of the Litsun River, while another prepared for attack by the enemy's aeroplane. During this reconnoitring, the aeroplanes were fired upon by the enemy but escaped unhurt. In the afternoon, during our attack on the enemy, one aeroplane kept flying over the enemy's positions and enabled us to ascertain by its reports the movement of the enemy.

An official statement made by the War Department yesterday afternoon is as follows:—

"One monoplane and two biplanes of our Aviation Corps left their base of operations between 6.50 and 7 o'clock in the morning of the 27th, and bombed the enemy's vessels to the west of Tsang-kow. They threw many bombs from an altitude of from seven to eight hundred metres.

"According to the observations of the aviators, most of the missiles either effectively hit the enemy's vessels or exploded close to them. The enemy were thrown into great confusion, and constantly moved to and fro to dodge the bombs, and fired their quick-firing rifles and machine guns promiscuously. One of our biplanes was hit by a machine-rifle bullet, the other by 26 bullets and two

gun shots, and the monoplane by five bullets. None of the crews or motors, however, were hurt, although the stem of the right wing of one of the aeroplanes was broken. The attack, in short, was attended by highly satisfactory results.

"One of our monoplanes flew over the enemy's position, and brought to our Army headquarters extremely useful report."

The seaplanes have been contributing more important service to our movement recently. On September 21st, Lieut. Wada and Sub-Lieut. Fujise made a flight over Tsing-tao and after spying out the general conditions of the enemy, threw down several bombs, two of which hit the base of the defence works on the southern end of an arsenal and seem to have destroyed it. During this reconnoitring, the seaplane was shot at from the enemy on land and sea, and although several shots narrowly missed the machine, the aviators returned safely.

On September 22nd, Lieut. Yamada and Sub-Lieut. Iikura, on a seaplane, reconnoitred again over Tsing-tao and dropping bombs, one of which hit and exploded on the eastern corner of the barracks of the Bismarck forts. The seaplane received shots from the enemy, but escaped unhurt.

On September 24th, Lieut. Wada and Sub-Lieut. Takebe on a seaplane, and Lieut. Yamada and Sub-Lieut. Osaki on another, scouted over Tsing-tao, and after having made important survey of the enemy's position, bombed the German destroyer, the forts, the barracks, and the wireless station, the effect of which is believed to have been good.

Lieut.-Commander Kaneko and Sub-Lieut. Fujise on a seaplane made a flight over the section outside Laoshan Bay, and detected machine mines, and achieved satisfactory results.

On September 27th Lieut.-Commander Kaneko, Lieut. Wada and Lieut.-Engineer Hanajima on a seaplane, Sub-Lieuts. Osaki and Fujise on another, and Sub-Lieuts. Takebe and Itakura on still another, made effective reconnoitring over Tsing-tao, and threw bombs on the wireless station and the aerodrome. They were shot at by the enemy, but none suffered the slightest damage.

## WHAT FRENCH PILOTS ARE DOING.

A CONSIDERABLE amount of criticism having been levelled at the lack of news regarding the activities of the aviation branch of the French Army, an official note was issued in Paris on November 8th. The following gives the principal points in the *communiqué*:—

Our aviators operate daily behind the German lines. Their achievements, although anonymous, are numerous and brilliant. They give information to our commanding officers, who find in them an invaluable auxiliary concerning the movements of the enemy and the progress of columns and supplies.

They are not liable to be stopped like cavalry by the uninterrupted lines of trenches. They fly over positions and batteries, enabling our forces to aim with accuracy: they drop bombs on gatherings of troops, convoys and staffs, and are an instrument of demolition and demoralisation. They clear the skies of Taubes.

The notebooks found on the German dead and wounded and prisoners go to prove that our aviation branch has performed its duty well, and produced at times the most startling effects. A few examples will suffice:—

Sept. 3rd.—In the course of a reconnaissance a French pilot was attacked by a German aviator. The latter was promptly pursued by a second French aviator, who, subjecting him to a violent rifle fusillade, forced him precipitately to descend.

Sept. 5th.—A French aviator struck a bivouac of a company of

the Guards, with the result that 8 men and 8 horses fell, while 32 soldiers were wounded.

Sept. 12th.—A German non-commissioned officer showed his men a coat almost torn to tatters, which belonged to one of some 60 men wounded by a projectile that had just then been hurled by one of our aviators.

End of Sept.—At Autry a bomb killed some 30 soldiers at the edge of the Seruit, another projectile killing or wounding 20 soldiers. A staff major installed there had to change his quarters in all haste.

Oct. 9th.—A bomb which burst in the midst of a group of cavalrymen killed 30 men and 50 horses.

Oct. 15th.—To the south-east of Lille a cavalry division which had been pursued and fired on during the whole of the day was, at length prevented from carrying out its object by a bomb.

Nov. 1st.—A staff major at Thielt had a severe trial from the fire of our aeroplanes, which hurled 32 bombs or shells there.

On their side the British aviators, whose activity is well known, pushed as far as Düsseldorf, and did great damage to the hangars and balloons at that place.

All these feats have been accomplished under the fire of the enemy, and not a single French aviator has appeared without being greeted by a salvo of grape shot or shells. The enemy's fire has not failed to cause us losses, but reserve pilots, burning with a desire to wage aerial warfare, have obtained permission instantly to mount the skies.

In short, the new arm has fulfilled its promise and has duly taken its part in the general success.

of Scotland, where they are able to obtain supplies of oil, petrol and other stores.

The above reward will be paid by the military authorities to any person who gives information leading to the discovery of any place which is being used in this manner.

Such a base would probably consist of a store of oil and petrol concealed in an unfrequented locality, possibly in charge of an armed caretaker.

Information should be given to the nearest military or police officer.

(Signed) J. S. EWART, Lieutenant-General,  
Commanding-in-Chief, Scottish Command.

### Hostile Aircraft in Scotland.

THE following is the text of a placard which has recently been issued throughout Scotland:—

#### £100 REWARD.

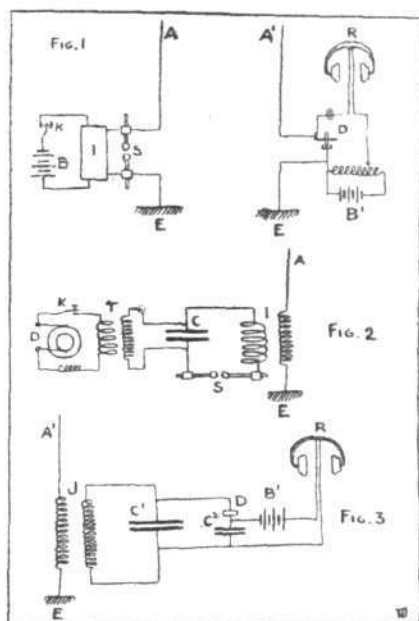
Numerous reports of the presence of hostile aircraft in Scotland have recently been received.

If these reports are true it is probable that the hostile aircraft have been operating from a secret base in some unfrequented part



## WIRELESS TELEGRAPHY AND AIRCRAFT.

BEARING in mind the great part which scouting by aeroplanes has played in the present war, and the necessity for means of communication to and from the reconnoitring machine, a description of one of the systems of wireless installations fitted to aircraft should be of interest to our readers. It may be useful, first of all, to briefly sketch the elementary principles of wireless telegraphy for the benefit of those who may be unacquainted with this important method of communication. The fundamental basis of wireless telegraphy consists of the following

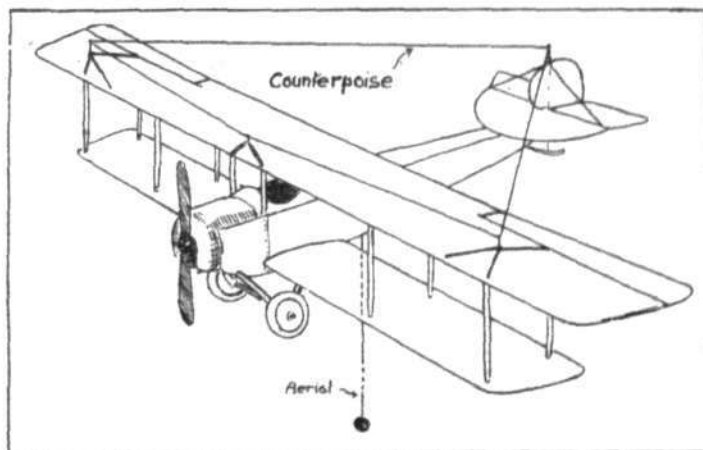


"Flight" Copyright.

Diagrams illustrating simple wireless telegraphy sets. Fig. 1.—The simplest form of transmitting and receiving set. Fig. 2.—The transmitting set of a more modern system. Fig. 3.—The receiving set for the same system.

electric phenomenon. If an electric current flowing through a circuit consisting, say, of a coil of wire, is intermittently interrupted, or if the direction of flow of the current alternates, a varying magnetic field will be set up round the circuit which will induce secondary currents in an entirely independent circuit placed some distance away from the first or primary circuit. Thus, a telephone receiver inserted in the secondary circuit will respond to these interruptions or reversals of current in the primary circuit. The distance at which the secondary circuit can be so affected is somewhat limited, but similar forms of induction over great distances can be caused by means of electro-magnetic waves produced by the surging backwards and forwards of an electric current in a length of wire termed an "aerial." These waves, which have the velocity of light, are known as Hertzian waves, and are employed in the Marconi system of wireless telegraphy. How these waves are brought about and caused to transmit messages, may briefly be explained with the help of the accompanying diagrams. Fig. 1 shows the simplest form of transmitting and receiving apparatus, in which A represents the aerial, a long wire carried by a mast and insulated from the earth. The lower end of the aerial is connected to one of a pair of spark balls, S, of an induction coil, I. The other spark ball is connected by a wire to the earth, E. When a primary current from the battery, B, is made to flow

through the induction coil, the aerial is charged with a high tension current until the latter breaks through the air space between the spark balls, S, in the form of a spark. The aerial then discharges itself, the current oscillating backwards and forwards from the elevated aerial and the earth *via* the spark gap, each oscillation diminishing in strength until they die out altogether, when the aerial is charged again as before. Each of these trains of oscillations in the aerial produces a similar train of Hertzian waves, which radiate from the aerial into space, like ripples caused by a stone dropped into water. So long as a primary current flows through the induction coil, so as to produce a regular series of sparks at the spark gap, a constant train of waves is emitted from the transmitting aerial, but any interruptions in the primary current cause similar interruptions in the waves. By inserting a Morse key, K, in the primary circuit, therefore, the waves can be broken up into long or short trains instead of continuous ones, thus producing "dash" and "dot" signals. The apparatus for receiving these signals consists of an aerial, A', with its lower end connected to one terminal of a "detector," D, the other terminal of which is connected to the earth, E. Also connected to the terminals of the detector is a telephone receiver, R, in series with a battery, B', the voltage of which can be varied. When the waves from the transmitting aerial strike the receiving aerial, they induce oscillations in the latter corresponding to those originating from the former. These induced oscillating currents flow from the aerial to the earth through the detector, and thereby modify the direct current flowing from the battery through the telephone receiver and the detector, in response to the "dash" and "dot" signals. Although the type of apparatus just described is not employed in modern wireless installations, owing to its limited range of action, and other disadvantages, the general principles are the same—in fact, it might be



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Fig. 4.—Sketch showing the fitting of a "counterpoise," which takes the place of "earth" on a biplane; also showing the transmitting and receiving aerial.

said that the modern system is only the old one elaborated. This is illustrated by Figs. 2 and 3, which show diagrammatically a modern transmitting and receiving set, in its simplest form. There are, of course, various modifications in detail in the systems now in use, such as tuning devices, wave detectors,



rotary spark gaps, &c., which cannot, in the space at our disposal, be dealt with in this article, but the following system can be treated as forming the basis of modern land and air systems. Referring to the transmitting circuit, Fig. 2, instead of employing an induction coil for

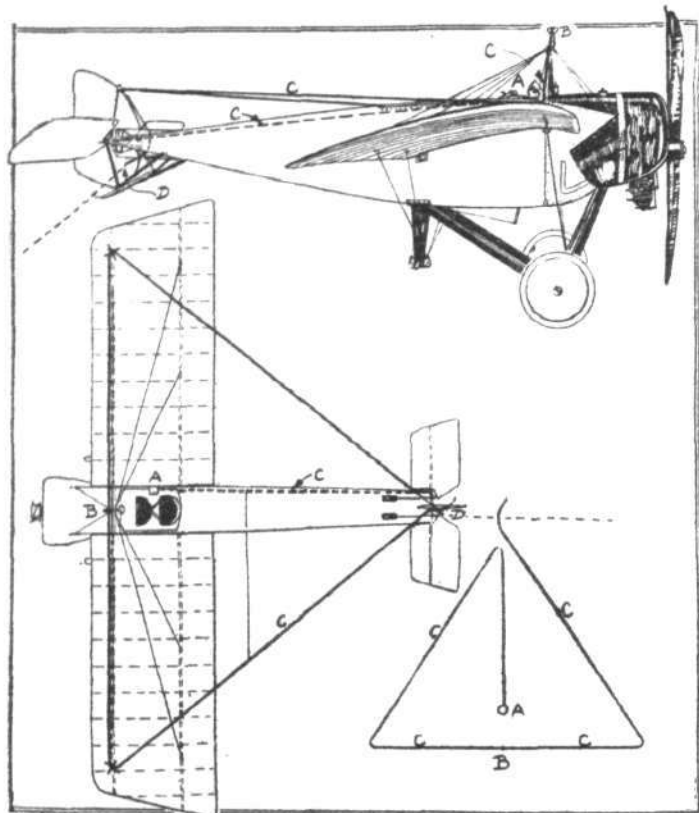


Fig. 5.—Sketch showing the Marconi method of fitting the aerial to a Morane-Saulnier monoplane.

providing the oscillating high tension currents in the aerial, an alternating dynamo or alternator, D, generates an alternating current at a comparatively low voltage, and this current is transformed by the induction transformer, T, into a high tension oscillating current. The latter charges a parallel plate condenser, C, until a spark jumps across the air gap between the spark balls, S, and then the condenser discharges itself through a primary inductance coil, I, setting up the surging or oscillating currents which induce similar ones in the secondary

consists of an aerial, A<sup>1</sup>, connected to the earth, E, through a primary inductance coil, J, sometimes known as a "jigger." The train of waves striking the aerial set up oscillating currents in the jigger primary coil, inducing similar ones in the jigger secondary, which is connected to the terminals of a condenser, C<sup>1</sup>. Also connected to the terminals of the latter is a detector, D, in series with which is another condenser, C<sup>2</sup>, whilst the telephone receiver, R, and battery, B, are connected to the terminals of this second condenser. The detector is so adjusted that the induced oscillating currents discharged from C<sup>1</sup> flow through it only in one direction, and so charge the condenser, C<sup>2</sup>, in a series of pulsations, which make themselves felt in the telephone circuit in the form of a click in the receiver for each pulsation, corresponding to the wave trains. The battery supplies a steady flow of current through the telephone receiver and detector, as in the first apparatus, *via* the jigger secondary.

Having thus given a crude idea as to how wireless "works," attention may be given to its application to aircraft. Several difficulties are in the way of its successful application in this direction; for instance, it is of course impossible to have any earth connections, as in the systems just described, whilst the weight, and therefore the capacity, of the installation has to be cut as low as possible—although in the case of dirigibles this is not such a vital matter. Again, the noise and vibration of the engine on an aeroplane interferes considerably with the receiving of messages. These and other difficulties, however, are gradually being overcome, but to all intents and purposes aerial wireless telegraphy is still in the experimental stage.

The transmitting and receiving systems for aircraft are much the same as those for land work just described, the main difference being in the absence of the earth connections. In place of the latter, some other conductor must be employed, and this generally takes the form of what is known as a counterpoise capacity. This either consists of a system of insulated wires run round the machine, as shown in Fig. 4, or else all the metal parts of the machine are electrically connected, and form the conductor. The aerial is suspended below the machine, and is weighted at the end in order to keep it taut and as vertical as possible. It is generally attached to a windlass so that it may be wound up out of action when necessary.

The Marconi equipment, which has proved quite

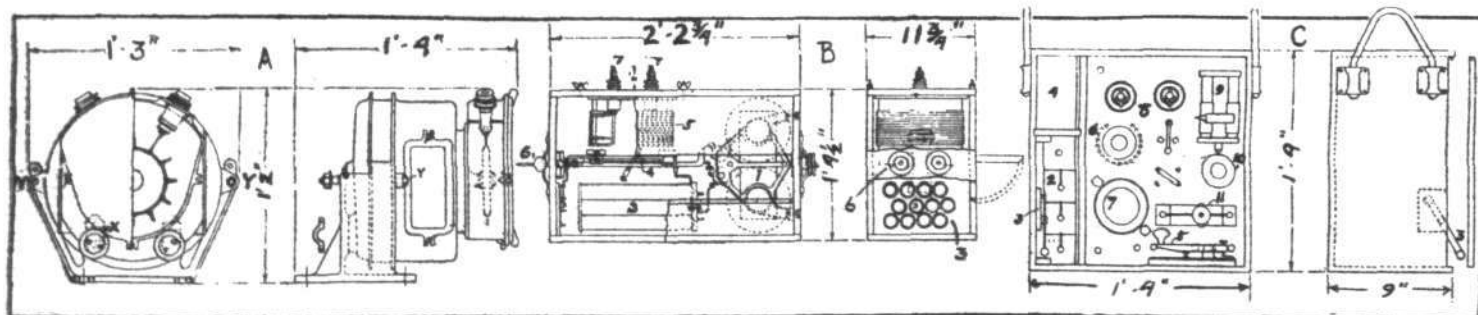


Fig. 6.—Detail views of the three Marconi units as fitted to a Morane-Saulnier monoplane. A, high frequency alternator and rotary disc-discharger. B, transmitting unit; 1, transformer; 2, choke coils; 3, condensers; 4, jigger primary; 5, jigger secondary; 6, disc-discharge terminals; 7, aerial and counterpoise terminals. C, receiving unit; 2, batteries; 3, battery cut-out; 4, telephones; 5, operating key; 6, aerial tuning inductance; 7, detector-crystal holder; 8, switches; 9, valve-tuning condenser; 10, intensifier; 11, potentiometer.

inductance coil of the aerial, A, and thus produce the Hertzian waves. The "dash" and "dot" signals are produced as before by means of a Morse key, K, inserted in the alternator circuit. The receiving circuit, Fig. 3,

successful, shown in Figs. 5 and 6, fitted to a Morane-Saulnier monoplane, is remarkable for its lightness and compact form.

The equipment is made up of three main units, Fig. 5,

placed in the cockpit of the machine in front of the pilot and passenger, consisting of a high frequency alternator and rotary disc-discharger, A, a transmitting set, B, and receiving set, C. The alternator is run by a belt drive from the motor of the aeroplane, and is claimed to absorb less than two-thirds of one horse-power. It can be supported by a horizontal tube at X and with the lugs at Y, in which case the supporting pedestal shown is not required.

The total weight of the generator and spark discharger is 80 lbs. The transmitting unit is contained in a polished case of hard wood, and weighs 84 lbs., whilst the portable receiving set is exceptionally light, weighing less than 20 lbs. The complete weight of the entire three units is under 184 lbs.

Using the *cabane* as a mast, the aerial, C, is run in the form of a triangle around the machine, as shown. Commencing at the pilot's cockpit, it goes to the tail,

from there to the right-hand wing tip, the pylon, B, the left-hand wing tip, and back to the tail, where a further length of wire trails from the tail-skid. This trailing-wire is so connected that should it become entangled with any obstacle, a slight pull is sufficient to sever it from its connection. Spare aerals are carried to replace those so lost.

A counterpoise capacity is employed in place of the "earth" connection or in place of a second aerial as sometimes used on biplanes. All parts are thoroughly insulated so as to avoid any possibility of receiving electric shocks. The transmitting key, switches for changing over from transmitting to receiving and *vice versa*, and all tuning adjustments are conveniently placed on the right hand side of both pilot and passenger within easy reach of both. These three units are shown in detail in Fig. 6, and most of the component parts previously mentioned in this article will be located in the Figure.

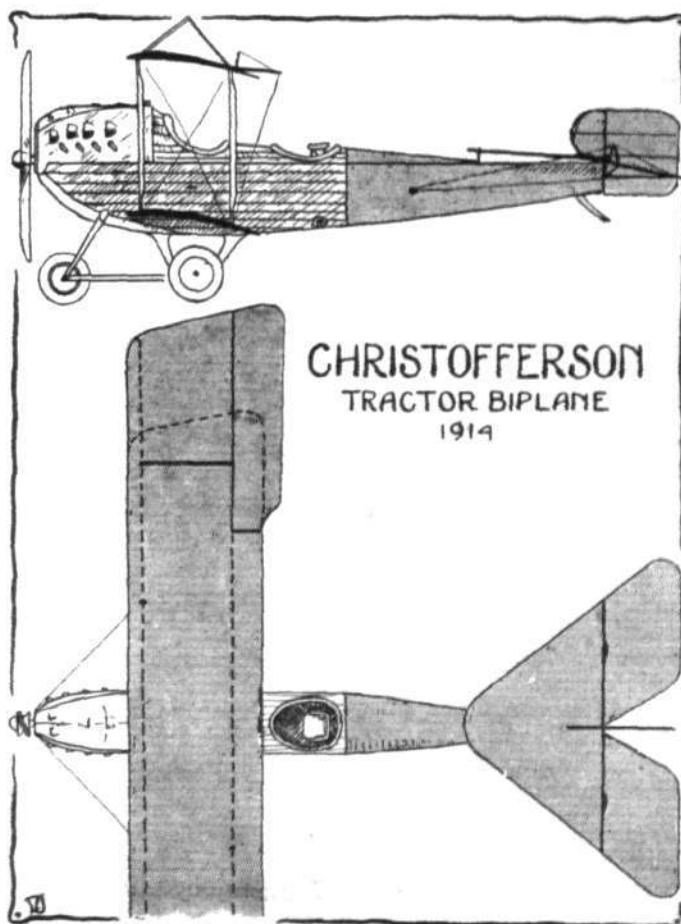
## ✱ ✱ ✱ AEROPLANE TYPES.

### THE CHRISTOFFERSON TRACTOR BIPLANE.

ONE of the machines entered for the U.S. army trials is a 100 h.p. tractor biplane built by the Christofferson Aviation Co. of San Francisco, Cal., the constructors of the Christofferson flying boats. As will be seen from the accompanying sketch-plan and elevation, the design is more or less on German lines, although it possesses distinct features of its own. The planes are built up on two main spars, spaced well apart, somewhat after the fashion of monoplane practice, the rear spar being of small section. Spars and ribs are of spruce, and the wing section also follows monoplane design. The top plane is made up of three sections, being supported on the *fuselage* by two pairs of vertical tubular steel struts, and a pair of A struts, the latter situated between the rear pair. The outer sections are braced by *cabanes*, and hinged to the extremities of the rear spar are large-sized *ailerons*. The lower plane is in two sections, one on either side of and attached to the *fuselage*. Substantial stranded cable is employed throughout for the wing bracing. The *fuselage* is of rectangular section, very deep in front, and tapering to a vertical knife edge at the rear. The longitudinals are of spruce and ash, and the struts of the latter material, whilst the whole is cross-braced with stranded cable. Mounted in the nose is a 100 h.p. water-cooled Hall-Scott engine, which is entirely covered by a beaten aluminium hood, in which are a number of louvres in front and at the sides for the purpose of admitting air to the radiator mounted behind the engine. This unusual position of the radiator renders it most accessible, though it appears that the heated air passing from it into the passengers' cock-pit would not be very pleasant, except, perhaps, in cold weather. Underneath the radiator are the fuel and oil tanks, having a capacity for four hours' flight. Immediately behind the radiator, over the centre of gravity, is the passengers' cock-pit, accommodating two side by side, and behind this again is the pilot's cock-pit, situated well at the rear of the main planes, where an excellent view below and around can be obtained. The control consists of a Curtiss-type shoulder-yoke for operating the *ailerons*, and a rocking column carrying a hand wheel, the former for the elevator and the latter for the rudder. From the nose to the rear of the pilot's cock-pit the *fuselage* is wood covered, the remaining part being covered with fabric. The stabilising tail plane, to the trailing edge of which are hinged two elevator flaps,

can be adjusted as to its angle of incidence. The chassis consists of two pairs of U struts, mounted to the *fuselage* immediately under the main planes, carrying an axle and pair of wheels, and a pair of V struts attached near the nose of the *fuselage*, carrying a single wheel. Another pair of struts connects the latter with the U struts. The axle carrying the two wheels is sprung by means of coil springs enclosed in cylindrical casings attached to the U struts. The principal dimensions are as follows:—Span, upper, 39 ft.; lower, 30 ft. 6 ins.; chord, 5 ft. 6 ins.; gap, 5 ft. 9 ins.; supporting area, 382 sq. ft.; overall length, 32 ft.; weight, empty, 1,325 lbs.; speed, 35-75 m.p.h.; climbing speed, 4,000 ft. in 10 minutes.

"VEE JAY."





# AIRCRAFT AND THE WAR.

Writing from "North of the Somme" on November 3rd a *Morning Post* correspondent said:—

"If the Germans have sprung a surprise upon us in the way of heavy guns, they have certainly also done something similar with their aeroplane service, for the activity of these aerial scouts all along the line is simply incredible. All over this Somme department there are daily visits of these pests, sometimes singly and sometimes several at a time. But they are not as expert bomb-throwers as our aviators, and their efforts in this direction leave the populace quite unmoved. As scouts, however, they seem to do good work in giving the range to their gunners, judging by the results of their visits, in the shape of greater precision in the arrival of the shells. In this department, as unfortunately in others, such as the transport of their big guns, the exceptionally fine weather we are enjoying this autumn is in favour of the Germans. In sunshine against a background of blue sky an aeroplane is infinitely less visible than in cloudy weather, and makes a very much worse target."

Another correspondent from Amsterdam:—

"My correspondent at Sluis telegraphs that yesterday afternoon an English aeroplane dropped some bombs on the railway station at Bruges and caused some damage. In Ostend also bombs were dropped. In Bruges and Ghent evidence of the progress of the Allies is gained by the fact that the gunfire is becoming more audible."

In an article in the *Echo de Paris* on November 4th, General Cherfils made reference to a concentration of German airships now in preparation on the Belgian coast, obviously with the intention of making a raid on London. After pointing out that it is certain the British and French military authorities have taken steps to deal with the menace, he goes on to anticipate a battle between the German dirigibles and the aeroplanes of the Allies. He continued:—

"Victory will rest with the fighting instrument which is most mobile, most rapid, most invulnerable, and most audacious. The Zeppelin is a delicate monster, fragile and condemned to inability to ascend to a great height under penalty of a dangerous condensation, which may bring about a catastrophe."

Writing in the *Journal* with regard to the Zeppelin works at Friedrichshafen, M. Georges Prade points out that since the beginning of the war a new Zeppelin has been turned out every three weeks:—

"Towards the end of July Z.24 and Z.25 were taken over on completion. Nos. 26, 27, 28, and 29 were sent out on various dates between August 10th and October 15th, and Z.30 was due to be sent out on November 5th. All these Zeppelins are of the same type. In their trials on the lake the dirigibles do not experiment with aerial torpedoes, but trials are conducted night and day with projectiles and searchlights, and the detection of floating targets, which they set themselves to locate on the German part of the lake, between Überlingen and Constance."

"The Belgians very nearly had the joy of bringing down the Zeppelin which flew over Antwerp. A Belgium projectile burst one of the balloons and fouled one of the propellers. A mechanic, who has received an Iron Cross for his resource, was able to make good the damage temporarily, and so enable the airship to get away."

Mr. Percy J. Philip, a special correspondent of the *Daily News*, writing of the possibility of launching submarines from Zeebrugge or Bruges, says:—

"One thing might prevent this—our aeroplane service. Near sunset a hydroplane passed high up over our heads along the frontier, and yesterday, so I was told, two chased by two Taubes were seen. It is obvious our air fleet is well alive to what the sea fleet requires of it."

A *Times* correspondent in a message from Flushing on November 4 said:—

"Last evening a British hydroplane circled in from seaward almost up to the Dutch frontier and surveyed in leisurely fashion the whole theatre of action; which does not suggest that the Allies are growing any less aggressive. All indications, indeed, combine to inspire encouragement."

News from Bordeaux on November 6th stated that among officers and men mentioned in French army

orders for gallantry in the field was Captain Mauger, of the Aviation Corps at Varennes, who devised an ingenious appliance for dropping heavy bombs from aeroplanes; and Pegoud, the aviator, who displayed exceptional boldness and sangfroid since the beginning of the war, and had his machine three times riddled with bullets.

Writing to the *Daily Mail* regarding the arrival of fresh troops in the British trenches Mr. George C. Curnock said:—

"In the morning the new draft woke to find itself still in the trenches, and a quaint, penetrating whirr overhead. An aeroplane passed—and a smoke bomb fell. The new draft remarked the ineffectiveness of the smoke bomb; but did not stir. They had orders to lie still while the German aeroplane passed over. After the aeroplane passed there was a good deal of shrapnel in the air."

In the *Petit Parisien* on Sunday appeared a letter from a reader who had just come back from Rheims. He wrote:—

"Last Wednesday a German aeroplane flew over Rheims and scattered proclamations setting forth that if the town did not surrender by five o'clock the following afternoon it would be set on fire with incendiary bombs. Some hours afterwards another aeroplane was seen but it was brought down by rifle fire near the village of St. Charles, both aviators being burnt to death. The next day four German machines flew towards Rheims seemingly with the intention of carrying out the threats of the day before, but six French aeroplanes attacked them and forced them to retreat. The German machines, seriously damaged, flew off to the north, but one of them was so crippled that it fell into a German trench, killing both pilot and observer."

A correspondent of the *Nieuwe Rotterdamsche Courant* who wandered into the German lines at Roulers, has stated:—

"The German aeroplanes now throw out smoke clouds to hide themselves when they are heavily fired upon by the enemy. The English and French aeroplanes took their chance, and though he saw many of them shot at and they seemed to be everywhere, not a single one, during the time he was watching was brought down. As to the fine work they were doing he saw several examples. German batteries which changed their position because they were under too heavy fire discovered, as soon as they found a new point, that they were still under the dominance of the other side."

Mr. Leonard Spray, writing to the *Daily Telegraph* on November 5th from "on the Belgian frontier," said:—

"Important works are being carried out also in Bruges and the surrounding district. The most important of these is the construction of a Zeppelin shed. This is being erected, with tremendous haste, at a point a little outside the town, to the south-east. In the erection of this shed a serious obstacle has been encountered. A work of such magnitude necessitates the employment of hundreds of carpenters and other artisans. Civilians were commanded to assist in the task. Most of them, however, refused to do so, their reason being the fear of the shed being made a mark for bombs thrown from aeroplanes. Threats that they would be shot if they did disobey forced a good many to the job. Others managed to escape from the town, and consequently great difficulty is being experienced in finding the necessary labour to complete the construction of the shed."

"As a matter of fact, the fear was, to a certain extent, well founded. The Allies' aeroplanes have taken a considerable part in the recent operations. They have been of invaluable service in reconnaissance work. From a distant base which must not be mentioned, both ordinary machines and seaplanes have flown along the coast-line held by the enemy, and made many incursions far inland. Easily locating the German positions, they have been extremely useful, among other things, in directing the fire of the naval guns."

"Incidentally, they have done a certain amount of bomb-throwing. Two days ago one airman flew over Bruges with the object of destroying tanks where the Germans have stored a large quantity of oil. Heavy mist made the operation very difficult, and the bomb missed its mark by about two hundred yards. It was fired at unsuccessfully by machine guns."

"It also escaped an aerial enemy. Returning, it was clearly



visible from the frontier, and I saw a Taube machine in pursuit. The Allies' aeroplane, however, was much swifter, and after a vain chase the German machine turned and disappeared towards Bruges.

"Evidently the attempt to destroy their oil supplies gave the Germans a shock, for I learnt yesterday that they moved them to other tanks at the new Bruges docks. Just after this was done another of the Allies' aeroplanes flew over Bruges. At a point a little outside the town was a small force of German soldiers. They were 'spotted' by the airman, who dropped a bomb. This fell quite close to the group, and, exploding, killed two soldiers and wounded several others."

In a message dated November 6th a *Morning Post* correspondent on the Belgian frontier said:—

"On two successive days this week the aeroplanes of the Allies have appeared over Bruges. Their objective, apparently, was the oil tanks. One bomb fell within a hundred yards of these stores, which are strongly guarded, and two German soldiers were killed. The enemy fired at the aeroplanes with rifles, but did no damage. A Zeppelin shed is being constructed in great haste close to the town, and local Belgian carpenters and other workmen have been commandeered to carry out the work under German supervision."

According to the Bruges correspondent of the *Nieuwe Rotterdamsche Courant* the aeroplane sheds at Knaffelaere have been taken down by the Germans and sent to a destination unknown. Machine-guns have also been mounted on all towers in the town.

A message from a *Daily Mail* correspondent in the North of France, dated Saturday, included the following account of a battle in the air:—

"Our airmen are ready at a moment's notice, and many duels are reported. An encounter took place during the week, when once again the Taubes came off second best. It was at — while fighting was in progress. Apparently the Germans had organised a raid upon —. There was a clear blue sky and signals were received that four Taubes were heading towards the Allies. Instantly two British and two French aeroplanes took the air. It was a sight never to be forgotten. The two French appeared to be carrying machine guns. The eight manoeuvred for positions. First up, then down, a long sweeping circle and back again. The Allies are in a favourable position, now the Germans are. Suddenly a signal comes from below. It is a clever manoeuvre: the Allies have enticed their opponents into a favourable position for our guns, and on the signal being given have turned away and are gliding to earth. Realising their perilous position, the Taubes make as if to ascend, but too late; shells are bursting around them, they collapse and dash to the ground a mass of flame. Not one escaped—the four were accounted for."

In a despatch dated Paris, November 2nd, a *Standard* special correspondent wrote:—

"Faster, better protected and heavier armed aeroplanes are now being turned out by the leading French makers at the rate of two or three per week. Those already in service have done much execution among the rival air fleets. In fact, under no circumstances now does a German aeroplane ever attack a French airman; all the attacking is done by the French."

"On the other hand, audacious though they be, the French airmen have learned by experience to give as wide a berth as possible to the new German anti-aircraft gun. This is a most formidable weapon, and it is common talk among any airmen likely to find themselves attacked by it that to be caught by a battery of these guns at 6,000 ft. is as good as already having one foot in the grave. Their fire is deadly between 4,000 and 6,000 ft., first on account of the incendiary shells they use, any one of which will set an aeroplane on fire; secondly, by reason of their force of explosion which displaces the air to such an extent that the mere passage of a shell is sufficient to capsize an aeroplane; and, lastly, these guns are fitted with an ingenious range-finder that not only gives the height of the aeroplane, but signals its speed at the same time."

"Yet the Germans 'get' a Frenchman very rarely. Often it has been a case of touch and go, and frequently a machine has to be smashed up after the pilot and look-out have come to ground in the danger zone and made a dash for their lines on foot. Rather than fall into the enemy's hands, and so deprive his side of the valuable information he was sent out to get, a pilot has plunged straight down on to a forest and yet escaped with his life, although, of course, wrecking his aeroplane."

In a description in the *Daily Mail* of the fighting round Arras, Mr. W. Beach Thomas said:—

"For about a month the Germans in considerable force and a strong position have been expending shells (such shells as long since flattened out the glorious old Spanish Hall and Tower) upon the town and the surrounding country. Their aeroplanes still appear like hawks and are daily chased, as rooks chase a hawk, by French biplanes and monoplanes, which are now in great force. But in spite of the guns and 'the eyes of the guns,' as these Taubes are called, the French have hardly lost a life, a result due almost wholly to the persistent watchful carefulness of the subordinate officers working under general instructions."

Mr. A. Beaumont, writing to the *Daily Telegraph* referring to this said:—

"The German aeroplanes frequently flew over Arras during the cannonade and threw bombs, one of which gravely wounded M. Lacroix, judge of the local tribunal."

Writing from Amsterdam to the *Daily Mail* Mr. James Dunn said:—

"At Bruges continuous bomb-dropping by the Allies' airmen has compelled the Germans to move their petrol depot every day at great trouble. The stock of petrol is very low."

From Dunkirk Mr. Basil Clarke wrote:—

"A German aeroplane dropped two bombs on Dunkirk this afternoon. One fell harmlessly into the dock and the other fell near the town hall, injuring a girl of sixteen and a girl of seven. Windows a hundred yards away were broken."

The following extracts are taken from a message from a *Daily Mirror* correspondent in Paris:—

"Among the most daring of the venturesome French airmen is a youth of eighteen—Corporal Edouard Leclerc."

"Tall, slender and straight, he is only a smooth-faced boy, and as he tells you of his adventures in the air—he has already brought down two Taubes—he does so in a modest and off-hand manner, with the smiling insouciance of youth."

"Corporal Leclerc first began to fly at fifteen. He went to England when sixteen, and his first fall occurred at Southport."

"He has flown over 5,000 miles in reconnoitring since the war began, on one occasion venturing into Germany as far as Cologne. I noticed that his leather jacket was disfigured by bullet marks, and he is now taking a rest to recover from a bullet wound in the thigh."

"One of Corporal Leclerc's most perilous journeys was accomplished when he was on duty at Villers-Cotterets. A tempest was blowing, and the officer commanding the battery asked for an airman who could undertake reconnoitring for a distance of seven miles over the enemy's lines. The commander of the Air Corps replied that, in view of the violent storm raging, it was impossible for an airman to go up. Young Leclerc overheard this, started off on his monoplane, located the German batteries and came back with the desired intelligence. Ten minutes later the enemy's guns were put out of action by the French '75's.'"

How the Germans in their trenches got news of a Russian victory through English papers dropped from an aeroplane is told by a wounded British officer:—

"On October 9th we got a bundle of *Daily Mails* with the report of a Russian victory, so the Flight Commander took up sixty copies and dropped them in the German trenches. Any number of the Germans read English, so we were frightfully pleased when we saw the little mail packets delivered."

Information has been received by the *Paris Journal* to the effect that German aeroplane makers are not building any more machines of the "Taube" type, only biplanes, very much on the lines of those used by the Allied forces, being built:—

"The three most important German builders are turning out 14 machines a week. The German aeronautical losses since the beginning of the war have been considerable. Up to October 15th 52 pilots have been killed or were missing and over 100 machines had been put out of action."

A correspondent of the *Times* in a despatch dated Lubeck, October 26th, said:—

"I was in Düsseldorf when the English airman visited the town for the second time. It was a splendid feat—he took the Germans by surprise. The soldiers seeing the hostile aircraft high up in the air shot at it continually until suddenly the aeroplane started to glide lower and lower; the people were mad with joy and shouted 'Hurrah.' The soldiers got ready to catch the aeroplane, as it were, when suddenly from a height of between 100 to 200 yards the airman threw several bombs, one of which reached the goal—

the Zeppelin shed, in which there was the air-cruiser, the pride of Düsseldorf, which had received orders to join the army in France that same afternoon. In spite of my being a good distance away, I heard the explosion, the smoke whirling high into the air, and I saw the airman escape in the common confusion.

"There really remained of the fine airship nothing but ruins and ashes, but the papers throughout Germany published the next day, 'Zeppelin shed slightly damaged.' Nothing was said about the four officers who were killed and the many who were wounded. But Düsseldorf knew in spite of the censor, and I cannot describe the nervousness that followed. People began to doubt if all that the papers wrote about their Army having daily victories was really true."

Mr. James Dunn, in a message to the *Daily Mail* from Rotterdam, on Monday, said:—

"At Aardenburg last night gunfire was heard at a considerable distance. The Allies' warplanes are closely watching the German movements in the threatened area. Near Courtrai a shell fired at a British aeroplane missed its object but, falling on the town, killed three people. From Brussels I learn that, although the big Zeppelin shed has been finished, the six airships remain at Hasselt for fear of the Allied aeroplanes flying from the plain at Etterbeek."

In the *Echo de Paris* on Monday it was stated that Turkey's "air fleet" which was to watch the Dardanelles exists only on paper. Turkey at the present moment possesses but a single aeroplane and no pilots at all, nor can she, as in the Balkan War, have recourse to the aid of foreign aviators.

In a despatch dated Saturday to the *Daily Telegraph*, dealing with the operations in Belgium and Northern France, Mr. Leonard Spray said:—

"Another factor which has caused great perturbation among the German Staff is the splendid work which has been done in the last few days by aeroplanes of the Allied forces. Endeavouring to meet this latest danger, they have brought several aerial guns westward from Brussels. In addition to those previously in possession, one of unusually large size was mounted two days ago at Ostend on a tower commanding the harbour. Fire from it was opened upon an aeroplane which flew along the coast just after it had been posted, but failed to do any harm."

"I have already recorded the success of the Allies' airmen at Bruges, where they threw bombs on the railway station and other strategic points. The answer to this has been the mounting of two guns, intended for aerial work, on, of all places, the belfry—the world-famous belfry of Bruges."

A *Morning Post* correspondent, writing from North of the Somme on November 6th, said:—

"The pleasant town of Rosières-en-Somme has been heavily bombarded, and in the outskirts of it at Harbonnières a German aeroplane committed one of the most dastardly bits of work yet recorded. There is a large school there, now mostly converted into an hospital, but with some class-rooms left. It flies the Red Cross flag conspicuously, and a week ago, while the children were playing in the playground, the German aviator deliberately threw several bombs—deliberately because the building stands well by itself. The bombs killed no children, but they killed or injured fourteen wounded soldiers."

Another correspondent, writing from the Belgian Dutch frontier on the following day, regarding the garrison of Ostend said:—

"It lives in constant dread of attacks from the sea and also from aeroplanes, to cope with which guns have been mounted in selected positions. Early yesterday morning my informant saw motor-boats equipped with machine-guns on the canal between Ostend and Bruges, and entrenchments on an extensive scale have been prepared. Two guns to shoot at aeroplanes have been placed in the belfry at Bruges. Despite these precautions, the air machines of the Allies continue to make their appearance in the vicinity of the town. A British hydroplane was seen there yesterday. So far as can be learned, the oil tanks and the 'Zeppelin shed' remain intact, but no doubt much useful information has been gleaned by the reconnaissance work of our aeroplanes."

In a despatch written from Paris on Sunday a *Daily Telegraph* correspondent gave the following account of the aerial patrols round Paris:—

"It is four weeks all but a day since the last Taube appeared above Paris. Not that they have not had all the wicked will to bombard us, but the system of air policing, organised after the concerted German raid on Sunday, October 11th, has proved

efficacious. It has been a very arduous task, that which the French pilots have been performing from sunrise to sunset, storm or shine or worse still, mist—a job at once nerve-racking and tire-some, as one of the Paris air patrols confided to a representative of Paris.

"We don't deny," he said, "that our work is necessary. Still"—and this was said rather wistfully—"we were useful up there at the front, and there is nothing so thrilling as flying over the enemy's lines. And now we have to patrol the skies above Paris for long dreary hours. We are pretty numerous, for it is necessary that at least six of us should always be in the air at the same time. The Taubes have got the easier end of the stick, for they can set out for our various bases along a front of 150 miles, and within 100 of Paris. Of course the wireless stations warn us of their coming, but even thus, the time is very short. With a favouring wind and more pluck than they have yet shown their aeroplanes could be over Paris in less than an hour. It is nerve-racking work on these misty, cloudy November days, for we have, so to say, to search the clouds, which are the 'trenches of the air.'"

"The worst of it from the point of view of the French air police is, that the Taubes, as soon as they see that the coast is not clear, turn and show a clean pair of wings. Not once in the neighbourhood of Paris has a German aeroplane been courageous or indiscreet enough to come within range of the machine-guns of the patrols. The Germans have a preference for the bombardment of undefended positions, and the skies of Paris, thanks to its vigilant flying squadron, are now no longer open. I do not know whether English aeroplanes have played any part in the defence of Paris, though certainly a day or two ago in the boulevards a man in the street, speaking with calm authority, informed me that it was certainly a British aeroplane that was passing over our heads."

"But it is certain that our Flying Corps has been doing excellent service in the north. The English pilot, especially, Lieut. R—, has performed prodigies of daring in the Pas-de-Calais, the sole credit of which he attributes to his latest 'mascot,' a spiked helmet which once belonged to a Prussian aviator whose machine he 'downed' several weeks ago. Fortified by this trophy, Lieut. R— last week insisted on flying over the enemy's line in a machine which he knew to be damaged pretty seriously. His superstitious confidence was justified, for he returned to the Allied lines unscathed and with very important information."

A *Daily Chronicle* correspondent with the Belgian Army wrote on November 9:—

"Dunkirk has suffered from three visits by German aeroplanes within the past forty-eight hours. The Germans dropped bombs on each occasion on the harbour. Their efforts to destroy the shipping in the port proved fruitless. Of the six bombs that were dropped, three fell into the water, and the other three fell wide of their mark. The damage done consists of large holes in the streets."

A correspondent of the *Morning Post* sent the following from Paris under date of November 9th:—

"A Bordeaux telegram gives the following account of the capture of a German aeroplane at Arques. On November 1st, about 9 p.m., the sentinels of that town announced that a biplane had landed in the marshes to the east of the Château. A patrol at once set out and found the aeroplane stuck in the mud, but no trace of its crew, and they proceeded to make a careful search. Suddenly one of the soldiers, named Groleau, heard a noise in a ditch, and raising his rifle, shouted 'Qui vive?' The answer came, 'We surrender; do not shoot,' and the German aviators came out holding up their hands. The patrol then started back to their quarters, one man on either side of the aviators, one man behind them, and two men twenty paces in the rear. Suddenly the prisoners leapt at the throats of their guards and brought them to the ground. One of the Frenchmen dropped his rifle, but managed in the wrestle to fall upon his enemy. The German drew a revolver, but before he could use it a man who had run up from behind shot him through the brain. Meantime the other Frenchman had knocked down the other German with the butt of his rifle, and as he still showed fight finished him off with the bayonet."

A message from a *Morning Post* correspondent dated Belgium, November 8th, contained the following:—

"To-day a Taube threw a bomb at Ypres—the third Taube attack; the second was made, as I have chronicled, on the occasion of the visit of the French President. No great harm was done, though the Taube's aim was good, the bomb reaching the Grand Place."

Writing from the north of France to the *Daily Mail* on Monday Mr. Ernest Macfarren said:—

"At Blangy a French airman dropped a bomb which destroyed the railway, and thus prevented several German trains from reaching their destination."



# Models

Edited by V. E. JOHNSON, M.A.

## Mr. E. Stanbrook's Olympia Model.

THE following are the chief particulars of this model, of which scale drawings, kindly supplied us by Mr. Stanbrook (of the Windsor Aero Club), are reproduced herewith.

*Fuselage:* Length 42 ins., top member hollow spar  $\frac{1}{4}$  in. square section, bottom members solid  $\frac{1}{4}$  in. by  $\frac{1}{8}$  in.

*Chassis:* of bamboo  $\frac{3}{8}$  in. by  $\frac{1}{8}$  in. section. Wheels turned from two pieces of mahogany and glued together with the grain at right angles, making the wheels two-ply ones. The skid to protect the propeller is of cane.

*Gearing:* two 1.5 in. gear wheels in 18 s.w.g. steel wire framing, 16 s.w.g. spindles.

*Tractor screw,* 12 in. in diameter, laminated, and of 15 in. pitch.

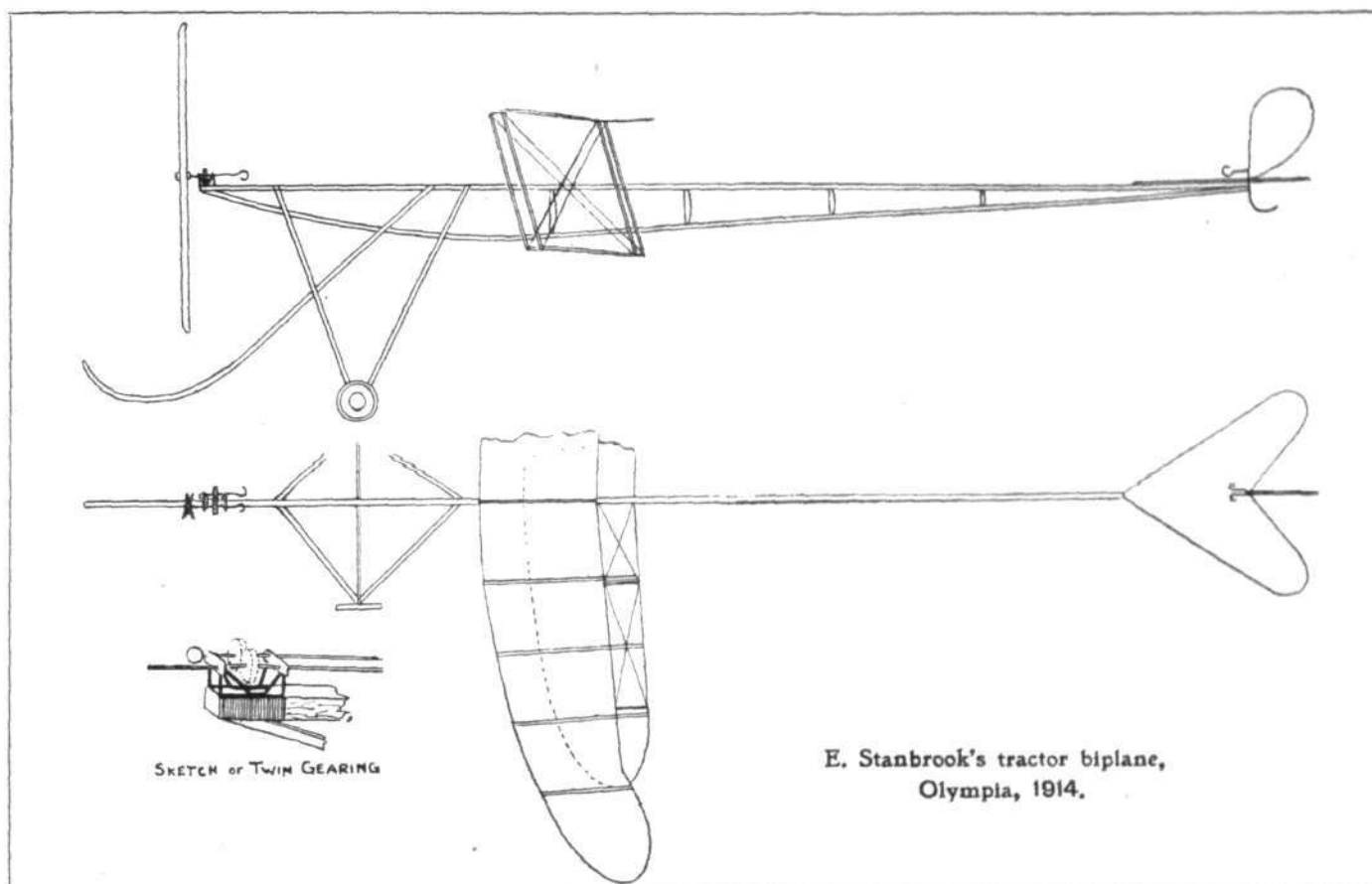
*Main planes,* Handley-Page plan form made of bamboo of  $\frac{1}{8}$  in.

up together. The front propeller was locked, and the model launched, driven by the rear propeller. When the rear propeller slackened speed, the front one was automatically released and took up the drive. The torque was, of course, the same for both propellers, and was counteracted by a suitable weight on one wing tip.

"The arrangement by which all this was accomplished was described and illustrated by me in a letter published in FLIGHT in, I think, 1911.

"After the publication of the description, I rather improved the device, and intended showing it at Olympia, and also coming up to London to beat the duration record; but had to give up the idea owing to illness.

"The propellers I used were two 10-inch Centrales."



E. Stanbrook's tractor biplane,  
Olympia, 1914.

by  $\frac{1}{8}$  in. section bent to shape. Span 30 ins., chord 4.5 ins., bottom plane 25 ins. by 4.5 ins., bamboo plane struts, tail of bamboo. Total weight of model 8.5 ozs. In the competition at Hendon the model was unfortunately smashed. The night before the competition the model landed in the river Thames, and remained there for some time. At Hendon before the competition it accomplished a duration of 40 secs., rising off rough grass. But the hollow spar had been weakened by its immersion in the water, and an awkward landing broke it at the first trial.

## Tandem-Propeller Models.

Mr. Charles M. Newton sends us the following communication:—"I was extremely interested to read your notes on the above, as I myself carried out similar experiments about three or four years ago.

"I constructed a single-stick model monoplane, with two propellers mounted tandem fashion, and, as in your case, mounted on a steel wire spindle running through a piece of brass tubing in which it revolved, the brass cogwheel carrying the other propeller, and revolving by means of two cogwheels.

"The propellers revolved in the same direction.

"I, however, with a view to greater duration, went a step further, and designed a device whereby both propellers were wound

## An Ingenious Twin-Rubber Motor.

A correspondent—Mr. Gavin Brown—sends us the following account of a novel form of rubber motor invented by him, in connection with which he will be glad to receive any criticisms and remarks from readers of FLIGHT:—

"Having noticed in a recent number of FLIGHT a few concentric gears for rubber-driven models, I send you herewith drawings and details of a device by which it seems to me the flight of a model could be prolonged. This I have partly achieved (at least, in the opinion of a fellow-aeromodelist and myself) by the invention shown in the accompanying drawing. I constructed a rough-and-ready model which worked very well under the circumstances, which were not quite ideal. I have no doubt if it were more exactly made and more neatly finished it would be a still greater success. The following explains how it works:—

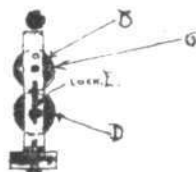
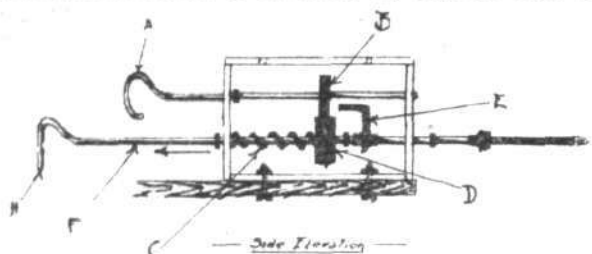
"The rubber is attached to the hook, A, then the propeller is turned in the usual manner until almost the required number of turns have been obtained.

"Next, the second rubber is given a few twists with the hand (this is to make it tight and keep it from slipping off the straight hook, H). The propeller is again turned. As this process proceeds



it will be noticed the whole shaft, F, will gradually move in the direction of the arrow, carrying with it the wheel, D. As this is continued, it will get out of reach of the wheel, B, above (but, before this actually takes place, the lock, E, *must* be inserted into one of the holes shown at C, end elevation). The lower wheel, D, now being clear of the wheel, B, the required number of turns may be obtained by continuing to wind.

"What actually takes place in flight is, the lower motor drives the propeller, and as it gradually unwinds the spring, C, pushes the whole shaft, F, in the *opposite* direction of the arrow, carrying with it the wheel, D. As this gets into connection with the wheel, D, the lock, E, is released, which frees the wheel, B; then the upper motor continues to drive. I need hardly mention the lock, E, is loose on the shaft, and does not revolve with it. I have omitted to mention that the rubber at the hook, H, drops off when it has



— End Elevation —

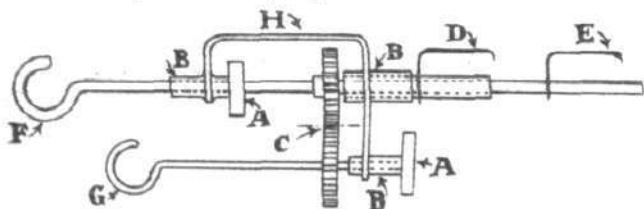
Mr. Gavin Brown's novel twin rubber motor.

become unwound (being put on loosely). Thus, it will not hinder the second motor by starting to rewind, and will also slightly lighten the model for the later part of the flight. If a small metal ring be fastened to the rubber, it will greatly assist this.

"The following facts have to be noted: (1) The rubber on the hook, A, requires to be *almost* double the strength of the rubber on the hook, H, if a uniform speed is desired; (2) in some cases the lock, E, did not slip, and then the duration was not so lengthy as was expected. As you will notice, the whole device is very simple in construction, having few working parts to get out of order.

"Do you think the propeller advancing gradually would upset the balance or change the flying angle? What is the value of such an invention?"

[In reply to the first query, No; to the second, Commercially nil. We do not think a longer duration either would be obtained by the above, but we shall be pleased to hear what some of our readers have to say. One or two other very interesting rubber motors have recently been brought to our notice, but we are not at present at liberty to publish details. One sent from the Colonies permitted a large concentration of weight about the c.g. We should like to see more aeromodelists working on such lines. The great difficulty in all *small* concentrated motors, which always include gearing of some kind, is the enormous amount of energy lost due to friction in proportion to the power developed.]



**A BALL THRUSTS. B BEARING TUBES SOLDERED TO CLIP. C GEARING. D PROPELLER CLIP FROM HOOK G. E PROPELLER CLIP FROM HOOK F. H CLIP FOR FASTENING TO STICK.**

Mr. W. G. Aston's "Wild-Cat" gear with "Aston" propeller clips.

## Mr. W. G. Aston's Wild-Cat Gear.

(See page 1086. October 30th.)

Mr. Richard Langley (an aeromodelist serving with the Colours) sends us the following very interesting description of the above:—

"From what I remember of Mr. W. G. Aston's 'wild-cat gear,' it had no intermediate wheel, G (Fig. 5), and was more like those shown in Figs. 2 and 3.

"I have taken FLIGHT from the winter after Blériot crossed the Channel, and I can truthfully say it gets better and better.

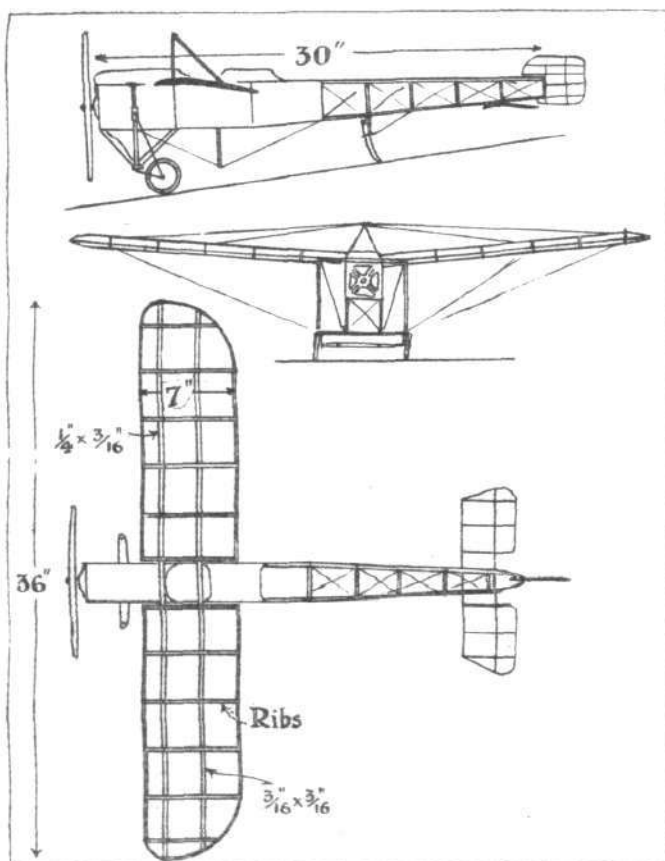
"Please excuse scrawl, but am sitting on a straw pailasse to write this."

## Dover Model Aero Club.

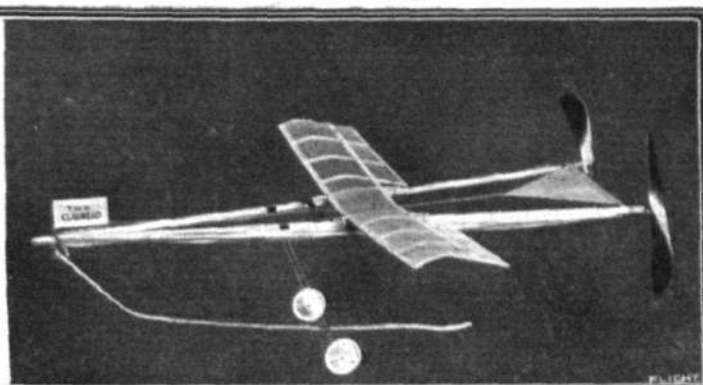
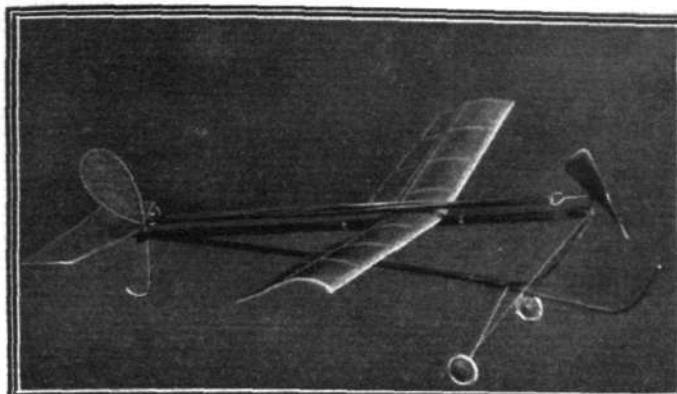
We have received the following from Mr. Cyril Watts (hon. sec. of the above club):—

"As secretary of the Dover Model Aero Club, I should like to draw attention to the statement made by Mr. Holman in a recent issue 'that the twin-propeller monoplane,' drawings of which were published therein, 'may (with limitations) be taken to represent the average type of machine flown by members of the Dover Model Aero Club.' This statement is decidedly not correct, since, for fully a year, the club has done everything in its power to discourage this type of machine. In fact, out of numerous competitions held, only two have been for this type, and these were arranged for new members who were not sufficiently advanced to make more scientific types. At present Mr. Holman is the only member in the club possessing this type of machine, and all the other members agree that the biplane is far more interesting and that its flying qualities are far better than those of the monoplane, so that tractor and pusher biplanes are the prevailing machines in the club, the latter holding the club records for h.l. duration and r.o.g. distance and duration, the record in the former case being 90 secs. Mr. Holman also says, 'the members of the club have for some time past been in bad repute owing to the fact that their machines seemed exceptionally heavy.' I fail to see how that conclusion is arrived at, considering the fact that two or three members have made 4 ft. biplanes, the total weight of which did not exceed 6 oz."

[We do not see that Mr. Holman's statements reflect in any way on the above club, even supposing them to be meant exactly as the secretary interprets them. The question of monoplane v. biplane will not be settled for many years yet, if ever. Personally, we rather fancy heavy machines, or, at any rate, machines which are heavily loaded; each, however, has its use, and neither should be neglected.]



A model Blériot constructed by Mr. Richard Langley, an aeromodelist now serving with the colours.



A COUPLE OF FINE MODELS BY MESSRS. T. W. K. CLARKE AND CO.—On the left, a tractor monoplane; and on the right, a tail-type twin-propeller monoplane.

#### Aeromodellists Serving with the Colours.

A correspondent writes suggesting the compilation of a complete list for publication of the above.

We think the idea an excellent one, and shall be very pleased to receive names and any further details for publication in due course.

#### Wimbledon and District Model Aero Club.

Mr. O. Hamilton, Jun., Hon. Sec. of the Stony Stratford and District Model Aero Club, writes as follows:—

"I was intensely surprised to read in the monthly reports of club proceedings the following sentence in the one from the above club: 'Mr. Chown's single pusher canard . . . reappeared on the 18th. Several flights were made, including one of 20 secs.; but it has been decided to abandon this type of model, as it does not give as good result as the tractor type.'

"It is, to me, rather a shock to find anyone abandoning a type because of a poor initial result, especially from the type of model enthusiast of the calibre of Mr. Chown's standing, who can obtain

145 secs. with a 3 ft. 3 ozs. 1-1-0-P2, to which I say, 'Hats off, gentlemen.' It is an unfortunate statement on the part of the writer of the above report, because facts and deeds must substantiate their possibilities. Firstly, there are the British official records, where Mr. Louch has 95 secs. to his credit; secondly, the activity of other clubs in this direction; thirdly, we, ourselves, feel to be a little in the running with regular flights ranging from 20 to 60 secs. Our active club member, Mr. Mennell, has stated often in our club-room that, given the attention and encouragement the twin has received, it will be on an equal footing with it. Mr. Elmes, another of our members, is very keen on the type, and he was the introducer of the 'boat-shape fuselage' to the club in 1911. This type was used by us in our earliest experiments, but the twin came in and swept the board, and concentration on these developed; but I am thankful to feel that we have returned to our old 'buses again, and also a more varied assortment of types.

"In conclusion, I think the decision of the Wimbledon Club calls for the ratification of the record class for this type."

#### KITE AND MODEL AEROPLANE ASSOCIATION.

##### Official Notices.

British Model Records.			
Single screw, hand-launched	Duration	J. E. Louch	95 secs.
	Distance	R. Lucas	590 yards.
Twin screw, do. . . . .	Duration	T. D. Collingwood	
	Distance	Chown	145 secs.
Single screw, rise off ground	Duration	W. E. Evans	290 yards.
	Distance	J. E. Louch	68 secs.
Twin screw, do. . . . .	Duration	L. H. Slatter	365 yards.
	Distance	J. E. Louch	2 mins. 49 secs.
Single-tractor screw, hand-launched	Duration	C. C. Dutton	266 yards.
	Distance	J. E. Louch	91 secs.
Do., off-ground	Duration	C. C. Dutton	190 yards.
	Distance	J. E. Louch	94 secs.
Single screw hydro., off-water	Duration	L. H. Slatter	35 secs.
	Distance	C. C. Dutton	29 secs.
Single-tractor, do., do.	Duration	S. C. Hersom	65 secs.
	Distance	D. Stanger	51 secs.
Engine driven off grass			

Official Notices.—A competition for compressed air models will be held at Wimbledon Common, on Saturday, the 14th inst. Intending competitors are

requested to be ready to start at 2.30 sharp, as it is intended if possible to give each competitor three flights, of which the average will be taken.

Prize Distribution.—Will all who held challenge cups, &c., the previous season forward these to the model secretary, H. A. Lyche, 46, Templeshen Road, East Sheen, S.W., during next week if possible, so that arrangements can be made to distribute these challenge trophies to the winners of the present season.

All communications with reference to models to be addressed to H. A. Lyche, 46, Templeshen Road, East Sheen, S.W.

#### AFFILIATED MODEL CLUBS DIARY.

Club reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Leytonstone and District AeC. (14, LEYTONSTONE RD., STRATFORD)

Nov. 15th, flying as usual, Wanstead Flats, 10 o'clock. Club's official records will be taken, duration and distance. Officials: Mr. B. Ludlow, Mr. L. Lamplugh, Mr. H. G. Bond.

#### UNAFFILIATED CLUBS.

S. Eastern Model AeC. (154, PECKHAM RYE, S.E.)

MEETINGS this week-end as usual. Owing to unforeseen circumstances the clubroom arrangements have been postponed.

## CORRESPONDENCE.

### Navigating Aircraft—How to Obtain the Speed of an Aeroplane Relative to the Earth, and its Position over the Ground.

[1887] In view of the fact that several articles have recently appeared in FLIGHT on the subject of finding one's way about on an aeroplane and on obtaining the "earth-speed," it may be of interest to you to have a description of two instruments which I have invented and which have been patented in the names of Mr. Arther H. Sippe and myself. The patent specifications are No. 24931, 1911, and No. 1591, 1912.

It would perhaps be as well to take the speedometer first. The action of this instrument depends upon the inertia of a sliding weight or disc. In one form of construction a weight is arranged to slide along guides placed in the direction of motion of the machine. This weight is kept in a central position by means of springs placed round the guides on which it runs. It is connected with a small wheel, which itself is mounted on a square shaft in such a manner that the wheel and shaft rotate together, while at the same time the wheel can slide along this square shaft with the movement

of the weight. The wheel is in contact with a circular disc, which is driven at a definite speed by clockwork, and normally the wheel lies at the centre of this disc so that no rotation ensues. When the machine carrying the instrument begins to move, owing to its acceleration, a force acts on the weight proportional to the product of its mass and the acceleration, driving it back along its guides against the action of one of the springs. It will thus be forced back to a point distant from the rest position a length proportional to this force, and, since the mass is constant, this length is proportional to the acceleration of the vehicle. So long as the acceleration persists, the weight and with it the little sliding wheel will remain in this position. Thus the wheel lies at a point whose distance from the centre of the time disc is proportional to the acceleration, and will be rotated an amount proportional to the product of acceleration and time. Thus a pointer connected to the end of the squared shaft on which the wheel slides will be rotated this amount as well, and may be made to move over a suitable graduated scale. When the vehicle is no longer accelerated, the spring will bring the weight back to its central position, the time disc will no longer rotate, the wheel and the pointer attached to its shaft will remain stationary. Its position measures the velocity the vehicle has attained. If the vehicle is retarded, the weight and wheel experience a force in the

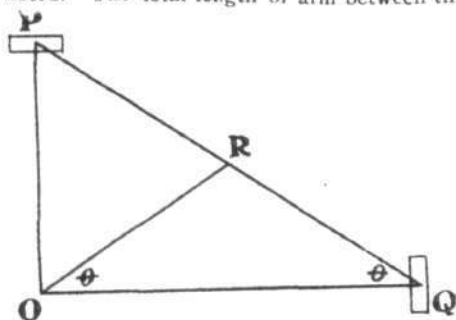
opposite direction and the pointer is turned back until the speed again becomes constant.

It will be obvious that such an arrangement as that described will be affected by any tilt of the machine. In order to obviate this, a vertical guide is provided carrying a weight equal to that of the sliding weight and mounted on a spring of suitable strength. This weight is connected by means of small levers (as in the sketch) to another small wheel equal in diameter to the other previously mentioned and also mounted on a squared shaft so as to be able to slide in contact with the lower surface of the time disc. The two squared shafts are connected together through a differential gear. The instrument will be unaffected by tilt, the sliding of the lower wheel being provided by the excess force of the spring when the instrument is on a slope.

The arrangement here described is that of the original patent specification, and would give a reading of the velocity in the direction in which the machine is travelling. I may perhaps say that a later development which I have designed would give the machine's *horizontal* speed relative to the earth, and this, of course, is the quantity most desired. At present only uncompensated (for slope) models have been constructed for experimental purposes, and these, in spite of mechanical defects, have given quite reasonably accurate readings on the level railway line between here and London. The instrument has been placed on the seat of a railway carriage. It has also been used in a taxi with frequent stops in the crowded streets in the City. The difficulties at present encountered are purely mechanical ones, while at the same time the inevitable expense associated with models of this sort makes development a slow process.

The other patent specification deals with an instrument designed for the purpose of showing an aviator on a map his exact position over the ground.

This instrument depends primarily for its action on two pieces of mechanism (1) that for obtaining the speed of the machine horizontally; (2) that for obtaining the direction of the machine. The first of these is derived from the speedometer just described, and the second from a form of magnetic or gyrostatic compass which, by means of delicate mechanical or electrical relay mechanism, enables a rotation of an arm to take place through an angle equal to that of the change of direction. It will be needless to describe this relay mechanism here, as details of it can be obtained from the patent specification, and I propose here only to outline the principles of the action of the instrument. Two friction discs are driven from the same shaft by means of mechanism controlled by the speedometer at a speed always proportional to the speed of the machine. These are mounted with their faces parallel, and between them are arranged in different planes two square guides at right angles to one another, each of them being capable of rotation about its own axis. Along these guides two small wheels in frictional contact with the discs are arranged to move, and the bearings of these wheels are connected by means of rods in a straight line to a point on another disc whose axis coincides with that of the friction disc. This disc is actuated by means of the relay mechanism of the compass previously noted. The total length of arm between the two small



friction wheels is equal to twice the distance of their point of attachment from the centre of this disc. In the figure, R represents the point of attachment, O the centre, P and Q the small wheels.

$$OR = RP = RQ.$$

Suppose that OQ coincides with the magnetic north, and OR is arranged under these conditions to lie along OQ. If the machine is turned through an angle  $\theta$ , ROQ becomes  $= \theta$ , and OP and OQ are proportional to  $\sin \theta$  and  $\cos \theta$ . Again, since P and Q are turned by a disc whose rate is proportional to the speed, V, of the machine, the actual rates of turning of P and Q are proportional to  $V \sin \theta$  and  $V \cos \theta$ , and P and Q will turn the shafts on which they slide at these rates.

These shafts are in turn connected in one form with the instrument, one to rollers carrying a map and the other to a device for causing a transparent strip of celluloid ruled with a line along its length. The cover of the map case consists of a sheet of transparent material ruled with a line across its centre at right angles to

the line on the celluloid strip. The map moves in one direction with a velocity proportional to  $V \sin \theta$ , while the strip carrying the line moves in a direction at right angles to this with a velocity proportional to  $V \cos \theta$ . It is evident that the *apparent* motion of the point of intersection of the two lines over the map will have a velocity compounded of these two velocities, *i.e.*, V in the direction  $\theta$  with the magnetic north, and thus will trace out the path of the machine over the earth on the map.

There are, of course, obvious criticisms. The principal one, I imagine, would be the difficulty due to magnetic variations. I have calculated the difference that this would make under extreme conditions, *e.g.*, flying over England from east to west, and I think it will be found that under present conditions of speed of flight, &c., the error would amount to 3 or 4 miles per 100. This would be almost entirely obviated by using a gyrostatic compass, though I am doubtful if in their present state of development these are sufficiently reliable.

The latter instrument is at present only partially constructed. I may add that a German patent (which, I believe, has been sold to the German Government, and is in use on the Zeppelins) on the same subject has been filed in England, but I think I may say that the design of my instrument is far simpler, and does not encroach on the other patent at all, proceeding, as it does, on different lines. I should be willing to give any other information on these instruments to interested persons. I think, however, that a perusal of the patent specifications will help to clear up any points I may not have been sufficiently lucid about.

The College, Epsom.

CHRISTOPHER W. C. WHEATLEY.

## The "Lang" Pitchfinder.

[1888] The following history of the Pitchfinder, illustrated on page 1103 of last week's FLIGHT, may be of interest.

This was invented by the late E. V. B. Fisher in June, 1909, and was used by Mr. A. V. Roe's staff to set the pitch on the adjustable propellers which were used on the 9 h.p. Avro triplane which made several successful flights on the Lea Marshes in July, 1909.

In 1910 Mr. Fisher patented the device, and it was exhibited at the Olympia Aero Exhibition on the stand that Mr. J. V. Neale shared with the Motor Accessories Co. At this time the pitch finder was made of black vulcanite, with a pendulum instead of a level. In the following year Mr. Fisher altered it to the form shown in last week's FLIGHT, page 1103, and it was again exhibited, but I do not remember on which stand. It was described and I believe illustrated in some of the Press reports of the exhibitions.

L. HOWARD FLANDERS.

Bexley Heath, Kent, November 10th.



## Aeronautical Patents Published.

Applied for in 1913.

Published November 5th, 1914.

22,250. — TREACHER. Floats for hydro-aeroplanes, seaplanes, &c.

Published November 12th, 1914.

21,212. M. P. OTTO. Apparatus for manoeuvring at a distance marine or aerial torpedoes.

27,263. R. A. CHALMERS. Launching aeroplanes and hydro-aeroplanes.

Applied for in 1914.

Published November 12th, 1914.

5865. J. C. HANSEN-ELLEHAMMER. Frames for motors with cylinders disposed in star formation.

12,043. E. E. PAULEY. Flying machines.

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